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apoc

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PERSONAL
COMPUTER

YOUR TOTAL TECHNOLOGY GUIDE

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Dell™ | Peripherals

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- 24X Max CD-ROM • 3.5" FDD
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- Sound Blaster® compatible Audio • 24X Max CD-ROM
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- Microsoft® Windows® XP Home Edition
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- 14.1" XGA TFT Display (1024x768 res)
- 3D Positional Sound with Wavetable • 24X Max CD-ROM
- Microsoft® Windows® XP Home Edition
- Microsoft Works Suite 2002 – OEM Version
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- 3 months Free AOL Membership¹ for new members. Conditions Apply² Modem required for access to AOL
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- Large 15" high resolution screen

Inspiron™ 8200 N1600VT Notebook

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- 32MB DDR 4xAGP nVidia® GeForce 2Go™ 3D video
- 24Max CD-ROM • Integrated 10/100 Fast Ethernet
- Internal 56K Capable Fax Modem
- Microsoft® Windows® XP Home Edition
- Microsoft® Works Suite 2002 – OEM version
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- Large 15" high resolution screen

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- 40GB Hard Drive • 3D Positional Sound with Wavetable
- 64MB DDR memory nVidia GeForce4 Go™ 4x AGP Video
- 15" Ultra Sharp UXGA TFT Display (1600x1200 res)
- 8X Max CD-RW/DVD Combo Drive
- Integrated 10/100 Fast Ethernet
- Microsoft® Windows® XP Home Edition
- Microsoft® Works Suite 2002 – OEM version
- Internal 56K Capable Fax Modem
- 1-Year Limited Warranty (Next Business Day On-site Service)
- 3 months Free AOL Membership¹ for new members. Conditions Apply²
- Inspiron™ 30 day money back guarantee from the date of invoice. Limited to one notebook per customer. In accordance with Dell's total satisfaction policy available online.

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Advertised price includes 17" CRT monitor (15.9" v.i.s.)

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- Sound Blaster® Live!™ Value Sound Card
- Harman Kardon® 695 Stereo Speakers
- 17" Colour CRT Monitor (15.9" v.i.s.)
- 56K Modem
- Microsoft® Windows® XP Home Edition
- Microsoft® Works Suite 2002 – OEM Version
- Norton Anti-Virus 2002 – OEM version
- 1-Year Limited Warranty (1-Year Next Business Day On-Site* Service)
- 3 Months Free* AOL Membership for new members. Conditions Apply.*

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BROADBAND SPECIAL 72

Whether you're shopping around for a broadband link to the Net, or wanting to squeeze the last drop of bandwidth from your cable or ADSL pipe, here's what you need to know.

STATE OF PLAY

The clever country? How about the not-very-connected country? APC examines why most Australians appear stuck in the slow lane.

BROADBAND BUYER'S GUIDE

Choosing the right connection technology, the right broadband ISP and the right plan for your needs.

SPEED UP YOUR CONNECTION

Tips and tweaks to optimise your broadband connection.

WIRED NETWORK KITS

APC Labs tests wired and wireless solutions for sharing your speedy connection around the home or office, from wired kits and wireless components to small business routers.

NEED TO KNOW 13

TECHNOTES

Tech news and expert analysis.

WATCHDOG

Bravely defending your rights in the world of unbelievably slack mobile phone service!

OPINIONS

APC readers have their say on, oh, just about anything ...including APC magazine!

ON TEST 31

The latest hardware and software goes under the APC microscope.

REVIEWS

OpenOffice.org 1.0; desktop and notebook workstations from Zenon and Dell; graphic cards from ATI; Sony's newest handheld and digital camera, plus plenty more!

NEW GEAR

Stuff that's so fresh we didn't even have time to review it.

FACE-OFF

Two leading phones from Nokia and Motorola shape up.

LABS CHALLENGE

We compare 40x CD burners, PC steering wheels and financial software for the home and office.

TECH BRIEFING

USB 2.0 and 1394b promise to speed up data transfer.



SMART 114

July 31, 2002

BUSINESS:

THE FINAL COUNTDOWN

Will Microsoft's new licensing policy send you heading for a software budget blow-out?

CAREERS:

HELPDESK HEROES

Can you climb the IT careers ladder from the humble helpdesk? You'd better believe it ...!

TECHLIFE 126

PC GAMES:

DUNGEON SIEGE

Dungeon Siege is a hack'n'slashfest in the style of Diablo; plus Heroes of Might and Magic IV, The Sims: Vacation, and Warlords Battlecry II.

CONSOLE GAMES

Get swinging with Spider-Man on PS2; rev it up on Xbox with MotoGP: Ultimate Racing



Technology; or take your plumber's pipe to the poltergeists in Luigi's Mansion for the GameCube.

DVD: TRAINING DAY

Denzel Washington eats up the small screen.

WORKSHOP 133

MOTHERBOARD OF THE MONTH

We dive under the covers with a new Gigabyte P4 board that's Northwood-ready.

BUT WAIT, THERE'S MORE...

Getting up to date with the C# programming language; building a Linux-powered MP3 player for your car; setting up a firewall on Mac OS X; getting organised with Entourage; managing hard disk drives in Windows XP; crafting user interfaces for the Web with Flash MX; and adding flair to PowerPoint presentations with Microsoft Producer.



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CD1 INDEX

WORKSHOP

MICROSOFT PRODUCER Microsoft Producer 1.0

PROGRAMMING Microsoft .NET Framework Software Development Kit, Antechinus C# Editor

LINUX CMMS 0.92, IglooFTP 1.2.1, XMMS 1.2.7 for RedHat 6.x, XMMS 1.2.7 for RedHat 7.x

FLASH Dreamweaver Extension Manager 1.4, Macromedia Flash MX 6.0, mail.php, splendor.fla

ON TEST

REVIEWS Extensis Portfolio 6, OpenOffice 1.0

LABS CHALLENGE: FINANCE MYOB Accounting Plus 12, QuickBooks Pro 2002, QuickBooks Pro 2002 Letters, Quicken Personal 2002, Sage Line 50 v6.02

NEED TO LOAD

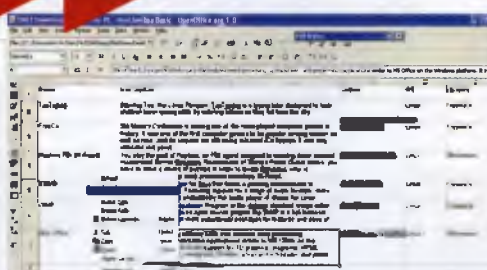
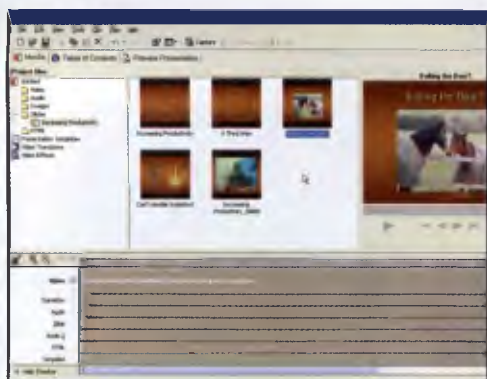
WINDOWS BlackWidow 4.15.1, BootIt Next Generation 1.15, DesktopX 1.1, Download Accelerator 5.0, EMailng List Pro 3.7, MicroSurfer 2.0, PostCast Server 1.5.12

MAC Apple iPhoto 1.1.1, iBeatTime 1.5, InstantLinks 2.4.0, MacDICT X 2.2, OSXCOPY 6.2, Youpi Key 1.7

LINUX gnochive, RAR for Linux 3.00, AntiVir 6.13.00.00, Vega Strike 0.2.0-14 Linux binary, Vega Strike 0.2.0-14 Data library

REQUESTS

AnalogX NetStat Live 2.11



OpenOffice.org 1.0

HIGHLIGHTS

Office wars

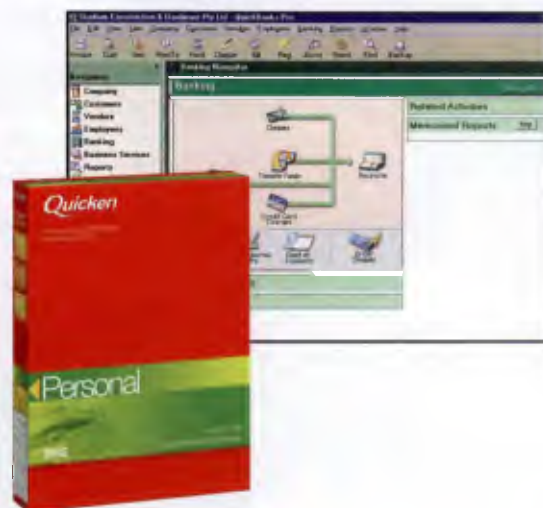
With the release of OpenOffice.org version 1.0, this free open source office suite reaches a major milestone in the campaign to woo users away from Microsoft Office. As the version number suggests, this is a fully stable release that uses the same core code as StarOffice 6 (now only available as retail product for US\$75.95).

Easy money

Are your personal finances getting too complicated to manage on paper? A personal finance package could be the answer. You can print out correct answers to Tax Pack questions and show your share performance graphically. Check out some of our accounting apps — like Quicken Personal (pictured right) — for home and small business users on this month's CD set.

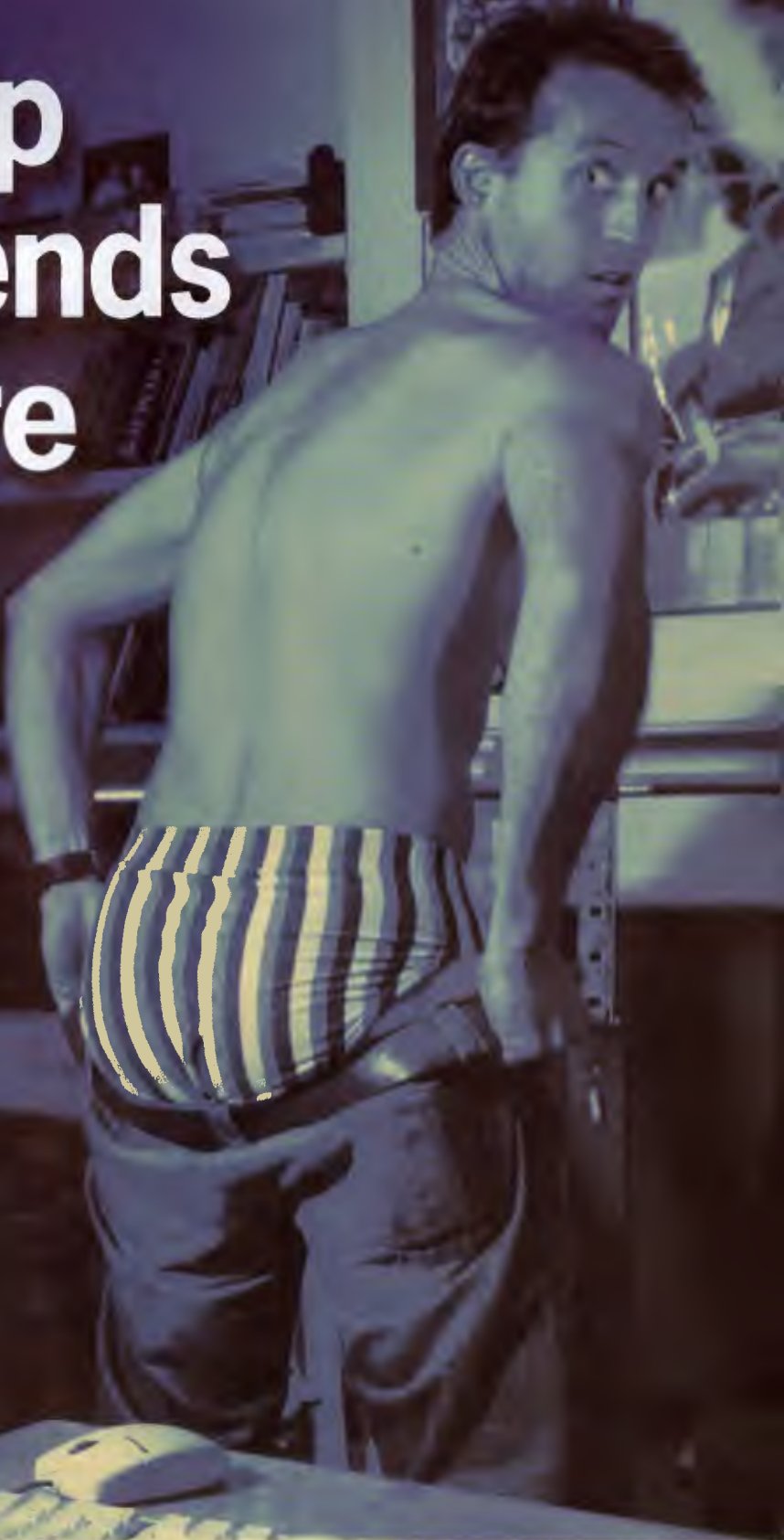
Web programming

Are you keen to try your hand at some Microsoft .NET programming? This month's CD Workshop includes the Microsoft .NET Framework Software Development Kit, as well as the very cool Antechinus C# Editor.



CD2 INDEX PAGE 8

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CD2 INDEX

FEATURES

BROADBAND UTILITIES Ativa Net Meter 3.0, Bigpond Watcher 3.0, BPUsage v2.2, DU Meter 3.02, Internet Usage Monitor 7.7, IPNetMonitor 2.5.2, IPNetMonitorX 1.0.1, Modem Booster 3.0, Network LED 2.0, PPPShar Pro 1.9, Trafmeter 2.74, WinGate 4.5, WinProxy 4.0

EDITSTUDIO EditStudio 2, EditStudio 3, EditStudio's Herb Garden

TECHLIFE

PC GAMES Jedi Knight II: Jedi Outcast, Soldier of Fortune II: Double Helix, Tony Hawk Pro Skater 3

DIRECTX

DirectX 8.1 runtime

TOOLKIT

Ad-aware 5.8, Adobe Acrobat Reader 5.05, Aladdin StuffIt Expander 6.5.1, BitchX 1.0c19, Downloader for X 2.0, Eudora 5.1, FinderPop 1.9.2, Fresh Download 3.50, GKrellIM 1.2.11, GraphicConverter 4.4, ICQ 2002a Beta Build #3727, Licq 1.0.4, Palm Desktop 4.0, PowerStrip 3.15, ProZilla 1.3.6, RealOne Free Player 6.0.10.446, RefUpdate 2.0, SiSoftware Sandra Standard 2002 (2002.1.8.59), smlRCle 1.0.1a25, TechTool Lite 3.0.2, Tex-Edit Plus 4.1.2, Toms Root Boot disk 2.0.103, Webmin 0.97, Winamp 2.80, Windows Media Player 7.1 for Mac, WinZip 8.1, WS_FTP LE 5.08, XMMS 1.2.7

BROWSERS

Microsoft Internet Explorer 6.0, Netscape 6.2.2, Opera 6.01

HIGHLIGHTS

EditStudio 2: exclusive free software

Give your home movies a dash of Hollywood flair with EditStudio 2! This month, APC and PureMotion give you a full working version of this fab video editing package that's packed with features fit for beginners or budding Kubricks.



Broadband bonanza

We've complemented this month's APC broadband feature by putting on our CD set the ultimate collection of broadband utilities. Along with trace utilities and Net usage meters, we've included Internet sharing programs, proxy servers and lots more to help you get the most from your connection.

Use the force

Lucasart's Jedi Knight II hits form with a successful mix of single player thrills and multiplayer action. Play the demo on this month's CD set. Plus, the Soldier of Fortune II demo and a level of Tony Hawk Pro Skater 3 offer two of this year's gaming highlights.

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There's a lot of speed happening in this month's *APC*, and it's all good stuff. In On Test (page 36), we evaluate one of the newest desktops built around Intel's new Northwood-class 2.53GHz Pentium 4 processor. While in Workshop (page 133), David Lin tests and tweaks one of the first motherboards to support Northwood's 533MHz frontside bus technology.

The cover feature on broadband explains why Australia still lags behind some Eskimo clans in the uptake of broadband services, and guides you to the best broadband connections. It also reveals tweaking tips that'll wring every last ounce of speed from your cable or ADSL link.

In Smart Business, it's speed of a different kind — the rapidly looming deadline of July 31 for Microsoft's controversial new software volume licensing scheme. This has many businesses re-calculating their budgets, recovering from the shock of a massive projected hike in license fees, and re-thinking their corporate commitment to the Windows platform.

And finally, as a magazine that recognises excellence in technology, *APC* was chuffed to scoop the pool at the 2002 Consensus IT Writers Awards. These awards recognise excellence in IT journalism and are endorsed and supported by the Australian Computer Society.

Staff writers Fiona Angus and William Maher won Best Feature of the Year for "20 years of the personal computer." Contributor David Braue took out Best Technical Feature of the Year, and *APC* even took line honours for Best Headline, "Fraud of the Pings." We also collected the Best Editor of the Year award.

David Flynn

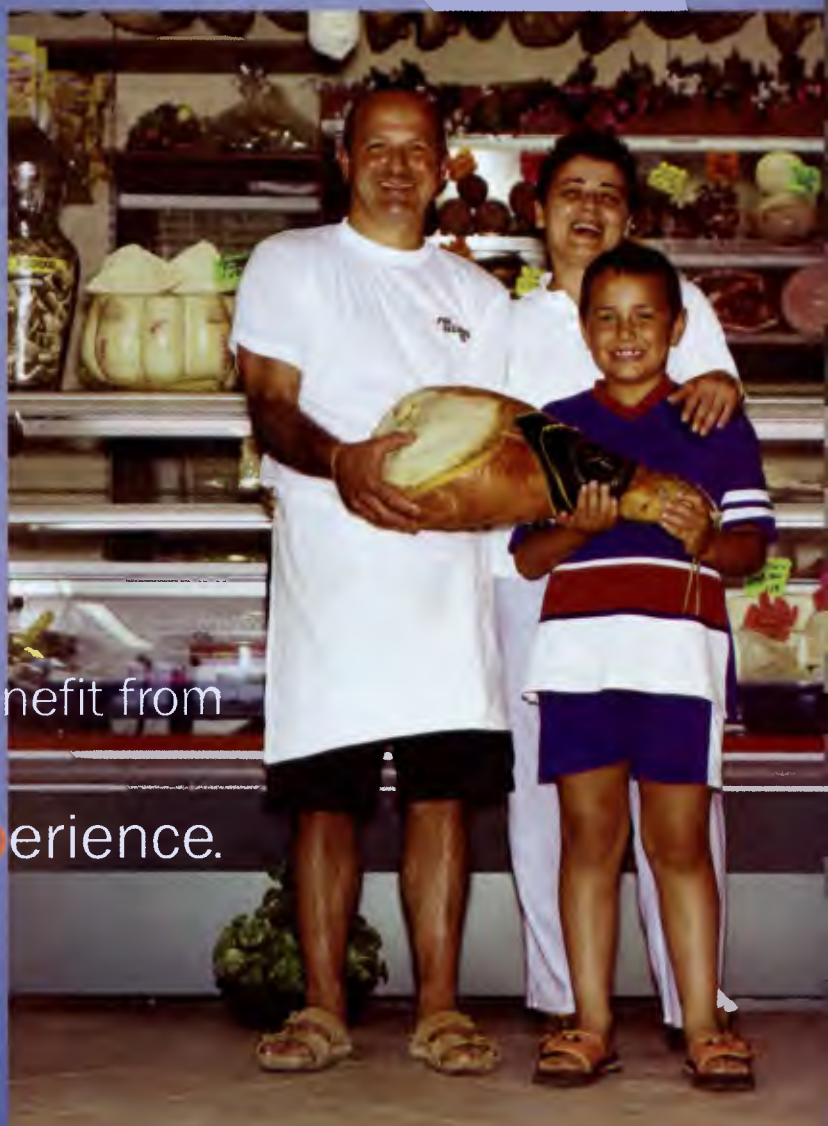
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need to know

news, views and analysis from the IT world

thenew.hp faces new.problems

This historical merger is set to put the spotlight on customer service. Garth Montgomery analyses IT's power marriage.



► Humble beginnings to IT powerhouse. David Packard (l) and Bill Hewlett at HP's 1939 HQ.

The Hewlett-Packard stock ticker is now HPQ. The URL for both Compaq and HP Web sites makes it plain: thenew.hp.com is now open for business. Why there's a dot between thenew and hp is anyone's guess, but the largest merger in IT history was completed May 3, 2002 for the tidy exchange of \$US19 billion in Compaq shares.

The merger faces product and staff duplication, low staff morale, confused customers, thinning margins on commodity products, and a poor position in services where the market opportunities are greatest.

Plus, the merger comes at a time when the IT sector is either near-death one week, or recovering admirably the next, depending on which analyst report is released. Either way, market-watchers have noted that consolidation is in some part a micro-reflection of wider industry concerns.

There is no contention, however, about the arduous task ahead for the companies. Competitors swim like famished sharks around HP and Compaq customers, and the leaders of thenew.hp are busy trying to buttress low staff morale from affecting its customer service.

Thenew.hp has already survived a bout of high profile corporate combat against HP family board members. Walter Hewlett and David Packard unsuccessfully argued that the merger would expose HP's successful printing business to the fickle PC commodity market — once dominated by Compaq.

As soon as the merger was announced, thenew.hp executives bolted around the country trying to calm employees. Six hundred Australian Compaq and HP employees are expected to be "open to new opportunities" now that the surviving product lines have been announced.

Naturally the two companies retained product lines that were, for the most part, market-leading in their respective categories.

The HP Jornada handheld, Omnibook laptop, Vectra desktop and Netserver have been deleted from the system. Thenew.hp will rebadge Compaq's handheld iPaq, Armada laptops, Presario and Evo desktops, plus the ProLiant IA-32 server. Plus, HP-UX triumphs over Compaq's Tru64.

However, the roadmap also flags a few crossroads on the horizon as thenew.hp attempts to keep some Compaq products competing against their brethren HP in the marketplace. At the top end of computing power, HP's PA-RISC-based servers will compete with Compaq's famed Alpha server in the business and scientific markets — though analysts speculate Alpha will eventually be put to rest.

The Compaq Presario will also continue to compete with HP's Pavilion PCs for the wallets of consumers and small business operators.

Thenew.hp claims this strategy is to "maximise brand equity" in the market. Analysts aren't convinced since the drivers for a merger were cost savings in manufacturing and marketing. "The PC space is where they are most vulnerable,"

said Ian Bertram, Gartner Group analyst. "It's a confusing strategy with two brands. Dell, IBM, Sun all have one brand. HP now has two brands.

"If I'm a CIO and a notebook has a certain service-level agreement, a price-point, tech configuration, support and warranty, then what do I care if the badge has been changed?

"And where's the brand equity in rebadging a Compaq iPaq to be a HP iPaq? You can't have brand equity in a commoditised product. The merger will make them stronger overall, but the execution is the key," said Bertram.

And it's a failure in execution that competitors are counting on. While thenew.hp is preoccupied with internal struggles, competitors will be relishing any lapses in customer service.

Professional services competitor NCR is one such company checking the pulse of market reaction as thenew.hp finds its feet. "Naturally we've had approaches (continued on p21)



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Web fees the future

Darrern Horrigan looks at the Web's future, and sees content fees as inevitable.



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Watchdog

Your right to access telecommunication services is enshrined in the Law, so why can't you get a decent mobile service?



26

epinions

Readers rage against bloatware and take up the fight for privacy, and continue the broadband controversy.



Show me the policy

Communications Minister Richard Alston has breathed \$129.5 million into a grand Information and Communications Technology (ICT) Centre of Excellence, shot down a major policy body and starved smaller projects of funds. Fiona Angus discovers the winners, losers and beggars from the 2002 Federal Government Budget.



► Senator Alston has announced an IT-mecca.

ALSTON GIVETH ...

Australia now has an official IT mecca with the announcement of a national Communications Technology (ICT) Centre of Excellence. "It will do for the ICT sector what the Australian Institute of Sport has done for sport," Alston said in a statement.

The \$129.5 million centre is the flagship of the Government's \$3 billion Innovation Plan, which was first announced in January 2001. The rising stars of IT will have free reign to develop

and commercialise new technology within the independent institution.

A consortium, including the NSW and ACT Governments, the Australian National University, the Universities of NSW and Sydney, venture capital firm Allen & Buckeridge, Redfern Photonics and Bovis Lend Lease, will contribute \$96 million to establish the centre.

... AND TAKETH AWAY

At the same time as realising the ICT Centre of Excellence, Alston has stripped key responsibilities from the National Office for the Information Economy (NOIE).

NOIE was set up as flagship agency to shape Australia's entry into the "information economy" in 1997. In 2002, it's been relegated to administering bookshops and Web sites.

Shadow Minister for Communications, Kate Lundy points to budget papers which state, "NOIE has transferred to the Department of Communications Information Technology and the Arts (DCITA) those functions directly related to the growth and development of the Information and Communications Technology (ICT) industry."

She described the budget papers as decidedly murky. "Clearly NOIE is being stripped of a significant area of policy and programs, a significant knee-capping which can only be interpreted as a loss of commitment to, and confidence in, the Office by the Minister."

Biometric ID



► Passport control goes hi-tech.

Biometric identification technology will be encoded into all Australian passports under new border control and defence research projects revealed in the Budget.

The Department of Foreign Affairs and Trade will devote \$3 million to research and it will develop facial biometric identification for all Australian passports. Under the new verification system, the government will extract key facial measurements from the digital image of your passport photograph and encode it on a magnetic strip.

The research will also investigate on-site identity verification procedures, such as iris scans.

Aussies to master more than one domain

One-name-one-domain limit is set to be lifted for .au names. Fiona Angus reports.

After years of industry infighting and consumer swindles, new rules for registering .au names are set to be introduced.

Australians will have easier access to .au names at lower prices under a new regulatory framework, promised domain regulator AuDA chief executive Chris Disspain.

The long-awaited new naming rules finally lift the "one-name one-domain" limit. Now you can register abbreviations of your Australian Business Name, your trademarks and sought-after generic names (such as computer.com.au).

The ban on geographical names however will stay. "There is a question on who should have those," Disspain said. Under a new dispute

resolution process, you can apply for a name that's already been registered if it's confusingly similar and registered in bad faith.

Along with cyber-squatting, Disspain wants to stamp out notorious "rogue" domain sellers. When you register a .au name, your personal details are listed in the public WHOIS database. "There is tremendous abuse of WHOIS," he said. Companies gather information from the database and use it for targeted advertising. In the worst cases, domain sellers send out renewal notices to rival companies' customers.

Under the new industry code of practice, Disspain said he can immediately suspend a registrar's right to sell domains if they (or any of

their resellers) "misbehave." The database is also rigged to block IP addresses that send more than 20 WHOIS queries in 24 hours. Only your name and email are listed. "What this means, I hope, is that the practice of sending faxes and mail will cease."

Entrenched .au wholesale provider Melbourne IT will now lose the right to be the central provider of .au to AusRegistry. All com.au, net.au, org.au, asn.au and the revamped "personal domain" id.au come from AusRegistry at a fixed price. A two-year licence to a com.au and net.au name will cost \$50 wholesale, while a id.au will cost \$25 (AuDA will take an \$11 fee from every registration). "We know that prices will come down," Disspain said.



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General								
Server space (MB)	0.5	5	20	20	50	100	200	500
Monthly transfer (GB)	0.5	0.5	1	1	2	2	3	3
Linux server	☒	☒	☒	☒	☒	☒	☒	☒
NT server	☐	☐	☐	☐	☒	☒	☒	☒
iShop ecommerce solution	☐	☐	☐	☐	☒	☒	☒	☒
Email								
Pop boxes	☐	☐	1	15	30	50	75	100
Unlimited email addresses	☐	☒	☒	☒	☒	☒	☒	☒
Unlimited email destinations	☐	☐	☒	☒	☒	☒	☒	☒
iMail browser-based email	☐	☐	☒	☒	☒	☒	☒	☒
Unlimited auto responders	☐	☐	☐	☒	☒	☒	☒	☒
Web Development								
Own CGI-BIN	☐	☒	☒	☒	☒	☒	☒	☒
.ht access protection	☐	☒	☒	☒	☒	☒	☒	☒
FrontPage extensions	☐	☐	☒	☐	☒	☒	☒	☒
SSL facilities	☐	☐	☐	☐	☒	☒	☒	☒
Cold Fusion support	☐	☐	☐	☐	☒	☒	☒	☒
Chilisoft support	☐	☐	☐	☐	☒	☒	☒	☒
Server Side Languages								
Perl support	☐	☒	☒	☒	☒	☒	☒	☒
PHP4 support	☐	☒	☒	☒	☒	☒	☒	☒
ASP support	☐	☐	☒	☒	☒	☒	☒	☒
Database								
MYSQL database support	☐	☐	☒	☒	☒	☒	☒	☒
Access database support	☐	☐	☐	☐	☒	☒	☒	☒
MSSQL database support	☐	☐	☐	☐	☐	☒	☒	☒
Quality								
24/7 server monitoring	☒	☒	☒	☒	☒	☒	☒	☒
Daily backups	☒	☒	☒	☒	☒	☒	☒	☒

Comparison with other web hosters as taken from their websites on 24 March 2002

Entry Level Personal Packages

Company	ilisys	Ozhosting	Commander	Net Registry
Package	basic	Standard	Bronze	The Promoter
Server space	20 MB	20 MB	20 MB	35 MB
Monthly transfers	1 GB	1 GB	.5 GB	1 GB
Set up fee	-	\$53	\$59	\$99
Domain name fee*	\$40	\$105	\$66	\$110
Annual cost	\$199	\$328	\$370	\$396
Total including GST.	\$239	\$486	\$495	\$605

*[.com] for 2 years

Entry Level Enterprise Packages

Company	ilisys	Telstra	Ozhosting	Commander	Net Registry
Package	Standard	Economy	Custom	Silver	The Marketeer
Server space	100MB	80MB	100MB	70 MB	50MB
Monthly transfers	2 GB	.5 GB	1 GB	.75 GB	1.5 GB
Set up fee	-	\$89	\$53	\$89	\$99
Domain name fee*	\$40	\$165	\$105	\$66	\$110
Annual cost	\$489	\$659	\$768	\$590	\$660
Total including GST.	\$489	\$913	\$926	\$745	\$869

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► *Peer to Peer computing has legs say researchers. Just try telling Napster.*

It's software, say forecasters!

Do you sometimes get the feeling that the researchers are a bit behind the game when it comes to the Next Big Thing? Last year it was wireless, but now we're being told that was off the mark. Yes, it seems bleeding obvious, but now the forecasters at PricewaterhouseCoopers reckon they've locked down the next big focus for the IT world in coming years — software.

The new buzz centres on initiatives like (no surprises here) Microsoft's new "software as a service".NET strategy. It's the concept that software be delivered seamlessly over the Web to your desktop when you want it — fast food style.

PricewaterhouseCoopers director Terry Retter calls the concept "logical". He's also confident that despite teething problems, companies will pay for software this way in the long run.

"Why not maintain it, it makes sense. Why not pay for what you use? To go through a major upgrade is very hard," Retter said. Still, the shift is causing untold headaches for thousands of businesses still wrestling with price hikes, annual fees, new concepts like subscription software and Web services.

The PwC 2002-2004 forecast also lends its weight behind another software concept given a battering lately with the demise of Napster — Peer to Peer computing. PwC notes a number of companies, including IBM, Intel, Sun and Microsoft provide technology that could serve as the foundation of P2P applications in the future.

Also given the thumbs up is open source software, with PwC citing a "global trend" towards software like Linux as an alternative to Microsoft and other commercial products. Retter predicted a "strong" future for open source for at least the next 10 years.

However, industry figureheads, like Ray Ozzie, argue software took a backward step during the dot com boom.

William Maher

Chips crunch the numbers

Hey, so you're pretty proud of that 2GHz chip, or even a 2.4GHz Pentium you've just bought? Yawn. All that stuff is already old hat.

In the world of silicon, blockbuster launches are now occurring so fast that soon we might have another Hollywood showstopper. Already on the shelves are new 2.53GHz Pentiums, and that's just to whet techno-appetites. By early next year we might see (fingers crossed) the 3GHz name go up in lights.

Don't believe us? Intel's already reportedly been showing off a 3GHz system, though they won't say when we'll see a consumer version. Its certainly showing no signs of slowing down, with local technical manager Graham Tucker predicting a "whole shotgun" of products planned for the year.

The reason is that some under-the-bonnet

tinkering has been done to rework the Pentium 4 chipset. The main change is a faster data bus, something Intel says will open the way up for faster P4 speeds in the future.

The chip game is now not just about speed. Some of Intel's new P4s come with on-board USB 2.0 and graphics, so there's no need for a separate video card. Costs are being cut in chip production by using smaller 130 nanometer technology and larger silicon wafers.

AMD is also adding 130 nanometer technology to its souped-up Athlon XP processor, codenamed Thoroughbred. But that's not all. On the horizon the PC world is planning a serious plumbing overhaul. There's Serial ATA, 3GIO, gigabit Ethernet, fibre optics... we'll leave the rest up to your imagination.

William Maher

You'll never pay full price again!

Once upon a time it seemed like the free software crowd was everywhere, chugging Jolt cola and eating pizza. Lately though, it seems they've been kind of quiet. So, what happened?

Now it seems the mystery has been solved — they've been beaver away on free, fully-fledged rivals to two of Microsoft's major desktop applications, Internet Explorer and Office.

Web surfers — get yourself the latest version by going to Mozilla (**Mozilla.org**), the fast and friendly browser pieced together by a worldwide collaboration of geeks and coders under the guidance of AOL's Netscape.

Mozilla also forms the core of the new Netscape 7.0, but don't expect a revival of the old Pepsi versus Coke browser wars of the mid 1990s — more than 90% of Web surfers now use Internet Explorer. Netscape 7.0 is currently in beta.

Sun also has a competitor to Microsoft Office, called StarOffice. You won't get the pro feature set found in Microsoft's Office, but for \$209 the trade-off might be worth the extra cash. Like Mozilla, there's also a free version for download called OpenOffice (**OpenOffice.org**).

If you've never tried free software, now you've got no excuse.

William Maher.

*Read our review of OpenOffice on page 32
StarOffice for business? Read more on page 33*

Googlocracy



It's been called the democratic search engine because it ranks Web search results according to how many links a site sends and receives. Now Google is opening its research and development projects for mass appraisal.

Try the Google Glossary (an all-purpose dictionary), Google Sets (matches related topics), Google Shortcuts (navigate search results with your keyboard) and for committed Googlers, run a Google voice search over the phone. Translate Web pages written in different languages or permanently fix Google to search in a single language (including Pig Latin, Scots Gaelic, Klingon or Elmer Fudd).

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Web fees the future



With several high-profile Web sites now charging for their content and services, APC asks whether this is the future reality of the Internet.

A process of subtle re-education has been foisted upon the Internet users of Australia. Its aim is to make us face the hard economic facts of life, the first of which states: "you get what you pay for." Or in the case of the Internet, what you don't pay for.

More and more of the online goodies we've been enjoying free for years will soon come with a fee, due to the failure of the 90s notion that content could be paid for by advertising alone. Many of the world's biggest producers of news, financial information, business advice, research, music, sports and entertainment believe the Internet public is now sufficiently mature enough to start paying for the content it values.

Boardrooms around the world are buzzing with talk that 2002 will mark the beginning of the end of the free Internet. Many suits and bean counters believe that charging for content is their company's only chance of survival. They expect new and improved online micro-payment will help their sites cash in. That's the bad news.

The good news is that, for now at least, much of what we'll be asked to pay for will be "premium content" — offerings beyond the base fare to which we've become accustomed. Think of it like the difference between economy and first class.

PAYING FOR THE QUALITY CONTENT

Some of the valuable free stuff will quietly slip behind the "membership" curtain and new menus of content will be created to tease a

subscription fee from our wallets. However, the Web industry is split on whether this approach is in the best interests of the Internet.

The attitude of those furthest to the right of the free content debate is most vividly put by Ben Silverman, the founder and publisher of Dotcom Scoop, a New York-based Web site that takes an insider's look at the technology business.

"Content should never be free on the Internet," Silverman states. "People put time and effort and money into creating content. Why should it be free? Newspapers aren't free. Magazines aren't free. People who say content should be free are idiots."

Not so says Steve Vamos, the CEO of ninemsn. He says, "free is the spirit of the Internet" and the very freedom it promotes is the reason for its popularity.

"The Web is about people being free to roam," he says. "It's access to free content, or to people with like minds or similar interests that has driven the extraordinary adoption of the Web."

"The Internet is a place where people can define their own world. You don't want to change that. But, as people start to put real value on aspects of the Net, they can start to pay for them. And they'll feel good about paying for them because they won't feel like they're being manipulated."

True to this philosophy, ninemsn announced recently that some premium services — like extra

storage space for Hotmail accounts — would soon attract a modest fee. Director of MSN South Pacific, Ali Stewart, says people have said they would also pay for computer games, coverage of special events, photos and imaging, and music.

Yahoo Australia & New Zealand managing director Nic Jones states: "We're keen to offer paid services, but not to replace free services. They would have to be compelling enough for people to be prepared to pay for them."

THE WINDS OF CHANGE

The Head of Content at ABC New Media, Ian Vaile, says the free content approach has given the ABC something more valuable than money.

"We've done extremely well from the content for free strategy. It grows our audience, it distributes our material and it reinforces existing audience. But some commercial providers may look back now and think it wasn't a good idea to go down that free path."

Take Napster, for example. The former pin-up of the free Internet had planned to release a new membership service with a monthly fee of approximately \$US7.

"File sharing communities that pay copyright holders and provide tools to help you do what you want with your digital music collection are going to prevail," said Napster on its Web site. "We feel strongly that the value you receive from Napster will make the fee seem insignificant."

However, these plans have since been shelved after Bertelsmann purchased Napster for \$US8 million in mid-May 2002. The nature and implementation of the proposed business model is back on the drawing board, but the concept of free content is not being considered.

According to Bertelsmann CEO Joel Klein: "Creating new ways of doing business is never easy, but Napster will be at the forefront of



▶ ABC New Media's Ian Vaile, says online charging "is a constant point of discussion."



► Steve Vamos, *ninemsn* CEO, says the issue is not one of free or fee, but a balance of both.

finding business models that respect copyright, reward artists and deliver entertainment value to consumers."

Bertelsmann's plans for Napster were not known at the time of writing, but the German media giant has been developing a significant online music strategy called BeMusic.

The aim is to bring together online music retailer CDNow, music locker service Myplay.com and, potentially, the file sharing services of Napster.

In May, owners of the file-sharing program KaZaA also announced its intentions to start a micropayment system in exchange for copyright protected audio and video content. The new secure content, currently free, is expected to cost between \$US25-\$US75 cents per file.

KaZaA and Napster are not alone. AOL, Google, Yahoo!, iVillage, Northern Light, MSN, Dow Jones, Reuters, *The Times*, *TheStreet.com*, *Salon.com*, *FT.com*, *Britannica.com*, *The Motley Fool*, *Netsurfer Digest*, soccer club giant Manchester United, and even that bastion of working class ethos, the Collingwood AFL club, have all in recent times whacked a charge on access to some or all of their online riches.

Late last year heavy hitter Yahoo! launched a fee-based document search in conjunction with business software specialists, Divine. Called Premium Document Search, it costs between \$US1 and \$US4 per item, and it comes with a free synopsis of what you're about to buy and a money-back guarantee.

Yahoo is also an official partner of the FIFA World Cup's online Web site. In return for its subscription fee, members receive access

to video highlight packages of tournament games and archived matches, plus other exclusive content.

Technology news site Slashdot — "News for Nerds. Stuff That Matters" — now charges for a version devoid of advertising. Surfers who opt to stay with the free site will be "penalised" with extra advertisements.

February this year saw the AFL and Telstra launch their own joint venture. The new *afl.com.au* networks provides video replays of games, and other related content.

Business news giants Dow Jones and Reuters put aside years of rivalry last June to launch a joint online service called Factiva.com. It charges \$US2.95 per article and now appears in 22 languages on more than 1.5 million desktops in 58 cities around the world.

According to president and CEO of Factiva, Clare Hart: "The debate is becoming clearer — users are definitely going to have to pay. The next question becomes, how much? This year is going to be make or break for most companies."

And on and on it continues throughout "Netland", the thin end of the payment wedge now obvious to all.

AUSTRALIAN PERSPECTIVE

Australian media companies know they sit atop goldmines of quality product, as do the major players in sport, finance, entertainment, lifestyle, leisure and music.

Ian Vaile admits it is sometimes frustrating to know that content the ABC distributes for free is material people would pay for online.

"It's a constant point of discussion," Vaile explains. "There are often opportunistic calls to try to turn some of the ABC brand attachment into revenue. That may be a space we move into. Some public broadcasters overseas, like the CBC in Canada, have gone that way."

Steve Vamos believes the issue is not one of free or fee, but a balance of both. "Over time, consumers will pay for things for two simple reasons: they value what they're getting, and they can't get it free elsewhere," he says.

Gerry McGovern, the founder and former CEO of content management software company, Nua, says free material has damaged the content industry.

"As long as people are not willing to pay for

content there will be a continuous decline in the overall quality on the Internet.

At some point, a bottom will be found. Enough people will become willing to pay after they get sick of wasting time clicking through oceans of free, mainly poor-quality content.

"It has to happen. Quality is quality, and quality costs."

Darren Horrigan

Quality pays

Forrester Research has said for years that quality content was the number one reason Internet users return to their favourite Web sites. But having given away content for years, and gaining popularity on such altruism, how does a site start charging?

This was never a problem for the online version of the *Wall Street Journal*, *wsj.com*. Since inception it has charged a subscription fee of \$US59 and now has more than 600,000 users — a success that has just helped finance a \$US28 million site makeover.

Speaking at the Periodical Publishers Association Interactive conference in London late last year, *Wall Street Journal* senior executive Chris Graves explained how *wsj.com* instituted its paid subscription.

"Why do people pay?" asked Graves during his talk. "Because we told them they had to."

Paul Mason is a professional day trader who earns "a comfortable living" buying and selling stocks online from his Brisbane apartment. He subscribes to four Australian and two foreign online financial information services. Mason welcomes the era of quality online subscriptions in the hope it will reduce crowding on the Net and put an end to the poor-quality content providers.

"The assumption by consumers that high-quality Internet content providers are selling out if they charge an access fee is naive," Mason says.

"I'm happy to pay for content online, but it has to be quality, delivered on time, easy-to-use, accurate, and beautiful to look at. And paid sites should not contain banner ads. Sorry, but if you're getting my money, don't ask me to deal with a slow, overcrowded site full of ads for stuff I don't want."

Mason's is perhaps a voice that speaks for many consumers.



(continued from p13)

thenew.hp faces new.problems

from customers dissatisfied about the proposed consolidation," said Damian Parkes, NCR infrastructure manager. "They are concerned that their business will be affected by poor post sales and delivery of services [as thenew.hp works through integrating its two companies]."

Parkes — an ex-Digital employee who resigned when Compaq took over — also claims low morale at thenew.hp could affect the customer experience. "A number of Compaq people have spoken to me. They're highly nervous and concerned about their jobs, but they can't talk to anyone like the media because they're not allowed," he said.

APC contacted both HP and Compaq to gauge staff morale and was stonewalled with each request.

To curry favour with corporate customers, thenew.hp has initiated a Transition Assistance Program (TAP). The program effectively cedes thenew.hp product with customers that were once Compaq environments, and vice-versa. Driving the initiative is the fear that Dell could snap up major accounts as customers reevaluate their equipment in a post-merger market.

"It's an amazingly arrogant program," said Rob Small, senior executive at Dell, who claims he's been approached by more than 10 major HP customers since the merger. "Customers decide what product they'll have, not vendors."

"Many customers who had supply arrangements with HP and Compaq are now more open to the Dell story. Because most companies have a policy of two suppliers and now they only have one [if both those companies were the preferred supplier]."

"When Compaq bought Digital, many Digital customers became Dell customers because the IT managers' supply had been cut off, and they don't like to be dictated to about who they'll buy from," Small said.

After four days of trying to speak to thenew.hp, APC was told that it wouldn't be possible to get an overview of the company's strategic plans or product roadmap.

"You can appreciate this is the biggest merger in IT history, and the first priority is bedding down employee issues," says Hugh Scott, thenew.hp spokesman.

It remains to be seen whether customers will

THE NEW.HP PRODUCT SET

CONSUMER PCS

Win: Compaq Presario, HP Pavilion

BUSINESS PCS

Win: Compaq Presario, Evo.
Lose: HP Vectra, Kayak

NOTEBOOKS

Win: Compaq Armada
Lose: HP Omnibook

HANDHELDS

Win: Compaq iPaq
Lose: HP Jornada

DESKTOP MARKETSHARE

HP*	22.5%
Dell	10.3%
IBM	7.5%

NOTEBOOK MARKETSHARE

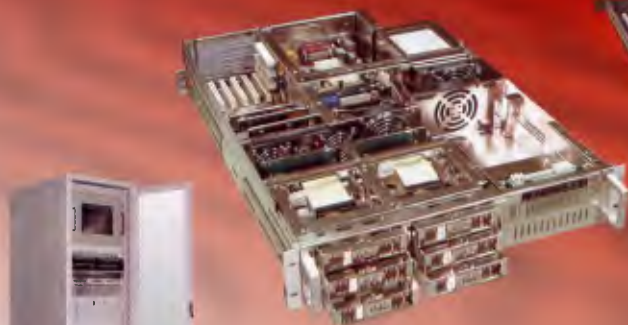
Toshiba	28%
IBM	16.6%
Dell	16.3%
HP**	15.9%

*Combined HP/Compaq **Compaq only
Source: Gartner

be subjected to same "employee issues" when trying to get answers from thenew.hp. ■

Let APC know about your experience and concerns with thenew.HP. Contact apc@apcmag.com

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Need to Know Watchdog

Life, liberty, technology

Under Australian law you have the right to basic telecommunications services, but are you really getting them?

Your right to basic telecommunications services is enshrined in the Telecommunications Act. Not only are you entitled to access a phone, but if it isn't fixed or installed fast enough, you can demand compensation or a back-up phone. It's the next best thing to a basic human right and the reason why Government figures show 97% of the population use a phone.

Yet these basic services aren't bestowed on the 86% of Australians who use a mobile phone. Telecommunications industry research shows that one in four mobile users has reported a dangerous situation. So what happens when your mobile isn't considered "essential" enough for basic minimum level of service?

Dear Watchdog,
I activated my new prepaid mobile on the Virgin network, but when I tried to talk to other people they couldn't hear me. Virgin said the handset was stuffed. At first, they indicated they could fix it, but then told me to take it back to the shop where I bought it. I gave it back to Kmart, but after a month they told me Motorola was still dealing with the paperwork and to wait another two weeks.

Then they said Motorola had lost the phone. A week later another guy rang and told me a replacement phone would arrive in two weeks. It hasn't. The most annoying thing is that I can't tell who's really to blame — Kmart, Motorola or Virgin?

*Glen Davison
Maroubra, NSW*

Watchdog asked each company what they had done with Glen's phone:

Dear Watchdog,
Kmart's position is that it does not wish to reply in this instance. Sorry for the delay in a response.

Kmart spokesperson

These twenty words were delivered through a contracted PR firm who couldn't explain why one of Australia's largest retailers wouldn't help Glen.

Kmart's brush-off was the antithesis of Virgin's zealous customer service.

Dear Watchdog,
Glen Davison has only ever contacted Virgin Mobile twice, once to activate his service and once regarding a billing enquiry. It is essential and a very strict KPI (Key Performance Indicator) for all customer service staff to keep detailed notes every time a customer calls in, no matter what the issue.

In relation to the returns process from Affinity channels, the process is that they should all come through us. If it's within 14 days, we usually replace after successful inspection at the warehouse.

If outside this timeframe, the customer

should still call us and we direct them back to the manufacturer. Kmart does not always follow our returns process and will sometimes exchange under its own 12 month-return process.

*Nicki Ramsay
PR Princess,
Virgin Mobile Australia*

Nicki offered to help Glen, but the bottom line was she didn't have his phone.

That left Motorola. Glen's calls to their business number went nowhere and he couldn't access their (\$1.95 per minute) 1900 "support" line from his PABX phone at work.

"I'd call from my mobile, if I had one." It wouldn't have helped. Motorola had never even heard of Glen.

Loan phones a lifeline

Can't live without your mobile phone? Given up your landline? What happens when a standard warranty repair or battery replacement stretches out for weeks? A mobile is more like a car than a typical electrical appliance.

And just like garages, friendly mobile shops offer "courtesy" phones while others can leave you stranded. None of the major mobile networks guarantee a loan phone, but some will help if you ask nicely.

An Optus spokesperson told Watchdog: "Optus stores are almost all resellers, so it's up to the individual store whether they provide loan phones. I can tell you that the majority of outlets have loan phones available. There's obviously a

limited supply, but they try to do everything to help the customer, particularly if you bought the phone through them."

According to Telstra Mobile's Chris Newlan, "Across Telstra's dealer network, it's up to each store. In our Telstra Direct shops, we have stocks of loan phones. Customers need to explain their case and we will endeavour to give them one. It depends on the availability of handsets."

Nicki Ramsay says that while Virgin Mobile "doesn't have an official policy that gives customers the right to a loan phone, we have a stock of handsets. To date, we've always been able to oblige with loan phones."

Vodafone did not respond.



Landmark refund decision

Catherine Browning from Balnarring in Victoria has a monitor, a Web cam, a scanner, a CD RW, a DVD drive, a set of speakers and a printer. But she's missing one thing: a computer.

Catherine bought an Athlon 1.33MHz system from Landmark Computers Victoria for \$2,935. But her PC began to heat up, reaching temperatures of up to 90 degrees. It burned out. Landmark fixed it. It burned out another two times before Catherine asked for a full refund.

Landmark offered her a refund — minus 10%. Jeeva Fernando from Landmark told Watchdog this charge was a legitimate "restocking fee", which allows them to recover the amount they lose for taking a product back. Catherine refused.

Landmark came back with a new offer.

They would give Catherine a full refund, but only on the PC box itself. Jeeva says Landmark covered the warranty on the PC because they had built it themselves, while the peripherals were covered by separate manufacturers' warranties. "We can't resell them," he explains. Catherine turned down the \$800 refund. "What am I supposed to do with a monitor and a bunch of peripherals?" she asks.

Under the Fair Trading Act, if a retailer sells you a faulty product as part of a package, then you are entitled to a refund on the entire purchase. "Am I just supposed to take their word that the PC is worth \$800? How did they come



up with that figure?" The original receipt for Catherine's purchase is not fully itemised. After all, it was meant to be a package deal. Catherine is seeking advice from the Department of Fair Trading.

Dear Watchdog,

Mr. Davison has reported significant time delays and a lack of help in getting information about the repair of his phone. When investigating customer satisfaction issues we endeavor to ensure that the purchasing of a Motorola phone is a good experience by having particular processes in place.

When ringing Motorola, caller details transferred at the caller's request to live help desk operatives are recorded in a customer service management database. When Mr. Davison contacted Motorola, or an authorised repair centre, he would have routinely been asked for a reference number for his mobile phone.

Without some form of reference, it is

very difficult to track individual repairs. Under these circumstances, he may have been told that little else could be done without more details.

Reid Gerrard

*Technical Service Manager,
Motorola Australia*

By elimination, Kmart seemed to be the culprit of this episode. "This store seems to have one guy who looks after these issues and he's impossible to find," says Glen. So he could barely believe it when, after two months of waiting, Kmart suddenly rang with news of his mobile. All hope died when Glen collected a handset with a broken keypad.

A sheepish Kmart sales assistant then tried to explain how they had lost his manuals and documentation. After inspecting the damage to his brand new mobile, Glen decided not to ask Kmart to fix it.

Watchdog then went back to Motorola and took up their previous offer to help. Reid called a trusted authorised agent near Glen.

Two days later, Glen had a new mobile. "The Motorola guy turned up at work today and gave me a new phone," Glen says. "It seems to work so far."

Motorola's 20 authorised repair centres have a failsafe tracking system and are contracted to

fix phones within 48 hours (barring part delays).

So if your mobile decides it can't handle the pace, you can bypass the potential problems at the shop and the telco and go straight to someone who will fix it.

Yes, Kmart still can't find Glen's manual.

Lost and found

More than 2,000 mobiles are reported lost or stolen each week, according to the telecommunications industry. But they're not actually "lost". Network providers can track every handset through a the unique IMEI (international mobile equipment identifier) code stamped underneath the battery (or dial *#06# to retrieve it onscreen). Network providers can identify and block stolen handsets, but haven't bothered — until now. Telstra, Optus and Vodafone have set up a database of missing phones at www.findaphone.com.au. Take out a subscription and you might recover a phone through their network of police stations and lost property offices. Mobile theft will become even less attractive after August 15 when Telstra will begin blocking missing mobiles.

Contact us

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TOSHIBA

The lucky country?



Prompted by your comment on Broadband Blues (APC April, page 12), I started searching for ways a person in my region could gain broadband access. Cable is not provided to all but a few chosen communities, with no future rollout proposed. If ADSL is available, it appears Telstra — and most other Internet service providers of ADSL I investigated — require a person to have a desktop PC with a PCI slot, and do not support any other machine, whether PC laptop or Mac. This leaves Satellite. Telstra and all but one of the other satellite providers (a smaller ISP that on-sells ihug) do not support any machine other than a desktop PC with a PCI slot. I am currently waiting on an external LX 2000 satellite receiver to be imported by that one ISP who is willing to make available a satellite service for both laptop PCs and Macs as well as the PCI solution for desktop PCs. Why don't the larger companies, like Telstra, OptusNet, TPG, iPrimus, offer this solution? Is it so difficult for companies with vast technological and information resources to find a simple solution to providing broadband access to all citizens of this lucky country?

**Simon Fowler
Mulbring, NSW**

AD ALERT

I found the information in your security article (APC April, page 57) very helpful, so it puzzles me that you included GoZilla free on that month's cover CD. GoZilla has long been identified as "spyware" software (on page 81 you even

mention it will cause IE to crash), and while it may be a really good tool, there are other free alternatives that don't spy on users. I agree that it's up to the user to decide what software they install (some people may not care if their privacy is invaded), yet I think you should at least warn us if a program is about to expose us to the software developer. It's hard to identify spyware all the time, but putting Ad-Aware and Spycheck on the CD was a big help.

**Kai Chung Liu
Epping, NSW**

Kai is just one of many APC readers to tell us about their battles with increasingly invasive software. So from this month, every program on the CD that we know contains advertising-supported software will carry our "Ad Alert" tag. There's also information on spyware and uninstall programs to help you beat back those devious privacy invaders.

SPEED IS MY CREED

I was a happy Dingo customer (APC May, page 16) until it announced it was closing down. My bandwidth meter usually read around 50Kb/s until the closure email went around and my speeds halved. I decided it was time to change ISPs and liked the look of ihug's "A dingo stole my access!" 3-month discount offer. I soon found their service to be worse than Dingo's, with average speeds of around 10Kb/s. A Dingo may well have stolen my access, but ihug has stolen my bandwidth — the most precious thing of all. I've finally signed up to a 256Kb ADSL plan with iPrimus. It may have taken four weeks to install, but now I surf at a decent speed and my hair has stopped turning grey.

**Doug Bailey
Smithfield, SA**

TEXT VERSUS LAYOUT

A bouquet to David Emberton for his "Headline Maker" article (APC May, page 135). It presented a relatively complex topic clearly without fluff and pad. I learned enough about RSS and some Flash features and limitations to make some real choices of my own. At issue here is pitching content and explanation to suit the level of

Letter of the month

Michael Whelan is dead right about software engineers writing bloated software (APC June, page 21). One interesting fact I discovered when studying C-programming at university a decade ago was the startling attitude that writing tight code was not really important because PCs were so fast and had so much memory. And what did we think fast computers and heaps of memory meant 10 years ago? I can't really remember but I suspect 486s and 28MB RAM was a terribly fast machine. Today, a 2GHz P4 with 1GB memory is a speedy machine. So not only do we have to put up with bloated software with every possible bell and whistle, but also an attitudinal problem in writing the code. Of course software could be written in assembly language, but it's clear that software writing also obeys the Peter Principle — that software code expands to fill the available memory.

**Louis Hissink,
Narrabeen, NSW**

Louis may be struggling with bloated software, but his prize for submitting our Letter of the Month should help him cope with moving even the fattest files between computers.

He's scored a compact Cruiser USB flash memory reader bundled with a 128Mb SD Card, worth \$308, courtesy of FlashMemory (www.flashmemory.com.au).





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Need to Know Epinions

expertise of the reader. A number of authors make, what I believe to be, the mistake of trying to create a "level reading field" by including too much introductory or background material. This only serves to reduce the amount of space available to get to grips with the complexities of the topic at hand. David deals with this through just enough inline explanation, references to online sources, and a few sideline "tips". Additionally, his article structure is good, like a short story really, it is focused and reduces brain fade.

Layout-wise, it is still a strain of perception to have to read broken lines of code snippets that have been coerced into the available column space. This is a general presentation problem and, I'm sure, not David's doing. Surely, code could be placed with a more liberal amount of width.

Rob von Nesselrode
Cairns, Qld

Rob and doubtless other readers will be relieved to know that APC has taken steps to offer a more code-friendly layout. Feel free to provide feedback on the new look seen in Workshop this month.

RIPPED OFF

My interest in your Mega Digital Music Guide (APC May, page 46) stems from my work and travel arrangements. I'm away from home for work reasons, so obviously I don't have access to all of my CDs. I've ripped a 1GB collection of my tracks from my (purchased) CDs and stored them on a second hard drive as 128 Kb/s MP3s. My PC speakers output a very decent sound (at least as good as a stereo), but I'm planning to upgrade to a Hercules Game Theater XP and Hercules XPS 510 Speakers. The increased optical output will also help copying tracks to MiniDisc, so I can listen to them while flying. It seems archaic that duplicating music I have paid for is illegal, as you clearly point out. It also makes selling MiniDisc and MP3 players seem silly — obviously people are going to copy their own music to their portable devices. Why else would we buy them?

Matt Clinch
Townsville, Qld

WINAMP ERRATA

I was reading your Digital Music Guide (APC May, page 63) when I came across an error in your section about Winamp. You say: "For example, you can create a playlist but short of individually deleting the tracks, there's no button control to simply clear it." I am using WinAmp 2.79, and I know of two different ways to do this:

1. In the playlist window, click on the List Opts button and select New List.

2. Click the Rem button and select Rem All.

These buttons have been available in every version of Winamp I have used.

James Collins
East Fremantle, WA

Thanks for pointing out our slip-up, James.

AN XP-LANATION

Thank you for a great magazine. After reading so much about Win XP and about how it requires lots of RAM, hard disk space and CPU grunt, I finally decided to try it on my P233MMX IBM ThinkPad600 with 96MB of RAM. The only reason I installed it is because Windows 98SE was unstable, responds badly to new hardware and software, and crashes easily. So I did a clean install of Windows XP Professional and it's working like a charm. I needed a stable OS for Web access, graphic design, and writing reports — and it's just perfect. It's a little slow, but adding a bigger hard drive and more RAM is all I need to get better results. I must say that since I can't

DVD DELIGHTS AND DILEMMAS

Thanks to everyone who wrote in about last month's bonus DVD. Many readers requested a DVD every month, while others who are without a DVD drive were disappointed with even one. Our research and your feedback tell us that most APC readers have a DVD drive, but we included a CD for those who don't. Our DVD only comes around occasionally and we do it to give readers something special (and it lets us pack in so much more great software). We're back to our regular two CD set this month, but we're hoping to repeat some of the DVD-featured programs and full-working versions on the regular CDs soon.

Agenda: your place to vent

All these threats from the music industry giants to encode CDs so they are unplayable on a home PC can easily be by-passed. Just connect the line out/audio out of your CD player to the line in of your sound card. Transfer the CD's WAV files to your HDD and then burn them as usual. There will be a slight signal loss, but who cares? We still listen to compressed MP3s without detecting chopped-out frequencies.

Errolle Rebeiro
Collie, WA

Have your say on the new APC Discussion Forum at www.apcmag.com

afford to get a new laptop, your articles have helped me get the best out of what I've got.

Nawar Dalati
Melbourne, Vic

HARD WORK

Firstly I'd like to congratulate you on such a good magazine, but I feel it's lacking something which could benefit everyone (and not just the 14 - 25 year-old tech geeks). It is a technical guide to building, upgrading and modifying your PC. I first purchased your magazine to help improve my knowledge in this area, and while I've learned a lot, my knowledge isn't expanding much.

Aaron Reading
Mitchelton, Qld

Keep your eye on our Workshop section for tips on upgrading and getting the most out of your PC.

Have your say

We welcome comments and suggestions. Send correspondence to:

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Letters can also be submitted online at apcmag.com. All correspondence becomes the property of APC and is subject to editing.



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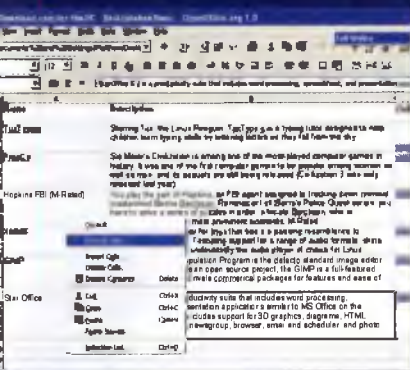
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Reviews, New Gear, Labs Challenge, Face-Off, Tech Briefing



Reviews
32
OpenOffice 1.0
Can this open-source suite shade the mighty Microsoft Office?



Face-Off

The Nokia 6510 and the Motorola V70 go head-to-head.



New Gear

58

Stuff that's so new, we haven't even been able to test it yet!

Labs Challenge

60

Steering wheel controllers

If you're serious about PC racing games, this is one road-test you can't afford to miss.

62

Finance packages

Four programs to help you get on top of your personal and small business budgeting.

66

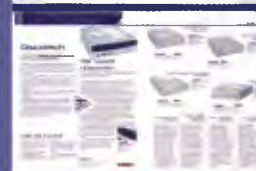
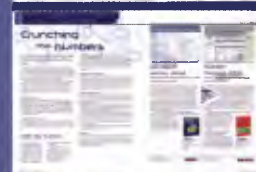
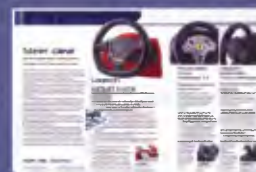
40x CD burners

We take five of the hottest and fastest CD recorders for a spin.

70

DVD-MP3 decks

Yes, we goofed last month. Here's our selection of living room DVD-R decks, this time with the *right* words on the page!

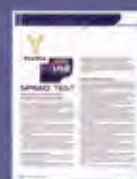


Tech Briefing

54

USB 2.0 and IEEE 1394b

Looking into the next generation of high-speed interfaces from the USB and FireWire camps.



36

Xenon Nitro 2.53GHz workstation

Intel's new Northwood-class 2.53GHz Pentium 4 chip gives this desktop plenty of grunt.

38

Dell Precision M50 notebook

Dell's combo of power, price and certified third-party app support makes this an ideal road warrior's choice.

40

Sony Cyber-Shot DSC85

It looks like a 35mm instamatic, but this 4-megapixel digital camera packs an impressive range of features.



42

PowerQuest Drive Image 2002

Despite some rough edges, this remains one of the best tools for Windows backup and recovery.

44

Sony CLIE NR70VG

Take one PalmOS-powered handheld, add a digital camera, MP3 player and mini keyboard...

46

HiTi 630PS

No more messy photo chemicals; print from your PC memory card to this compact unit.

48

Iomega HDD

Another player enters the external hard drive market. The results are mixed...

48

ATI FireGL 8700 and 8800

These two new graphics cards are squarely aimed at pixel-pumping workstations.

50

Muze Digital Audio Player

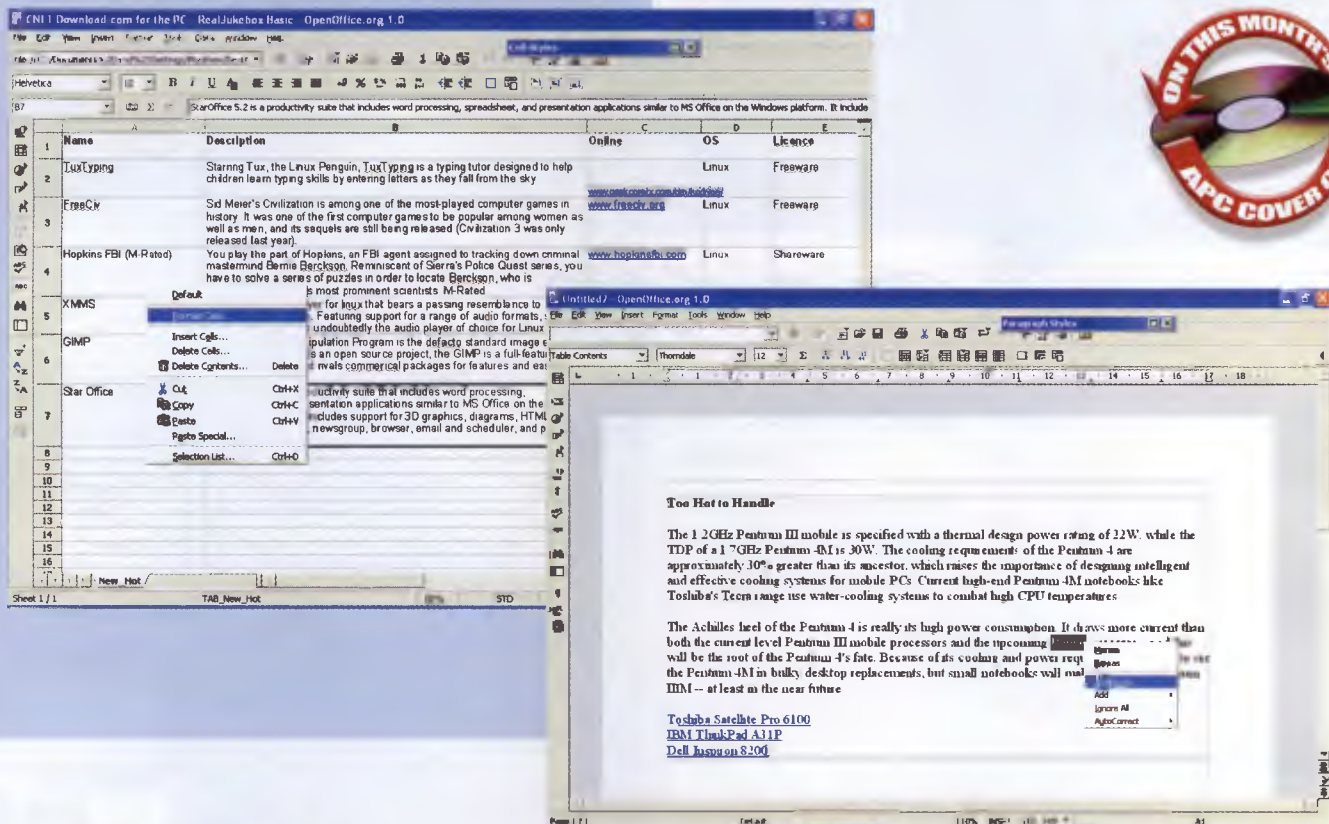
If seven hours run time on one AAA battery sounds good, wait until you see how small this baby is.

50

Extensis Portfolio 6.0

Professional cataloguing with an emphasis on image management — in a couple of flavours.





OPEN for BUSINESS

Microsoft's desktop dominance is once again under threat, this time from OpenOffice.org, an open-source office suite for Windows, Linux and MacOS. Matt Overington explains.

First it was Linux attacking the stronghold of the Windows desktop. Then the open-source Mozilla project put welcome competition back into the browser market. This time it's Microsoft Office — one of Redmond's sacred cash cows — in the firing line. But the threat doesn't come from Corel WordPerfect or Lotus SmartSuite. The new kid on the block is OpenOffice.org 1.0 — a fully open-source suite born from the code of Sun's StarOffice 5.2.

As such, OpenOffice.org is a half-brother to Sun's latest StarOffice 6, but without the latter's database application, telephone support or the \$209 price tag.

The goal of the OpenOffice.org project is to create a complete office suite built on open-component APIs and XML file formats, which will enable it to run on all major platforms. OpenOffice.org is currently available for Windows, Linux and Mac OS X and is distributed under the GNU public licence.

The acid test, of course, is compatibility with Microsoft Office documents. The rendering engine contained within OpenOffice.org 1.0 proved excellent, and while not 100% compatible with Microsoft file formats, it's exceptionally close.

OpenOffice.org accurately displayed nearly all documents we tested (both in HTML and Microsoft's native DOC format) in Microsoft Word and OpenOffice.org. However, larger documents with complex formatting — such as nested tables and intensive VBA macros can put a strain on the application.

Only once in three weeks of heavy testing did a Word document (overlaid with graphics and tables) fail to load. Even then, OpenOffice.org did not crash completely; it just overloaded the rendering engine and began



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to crawl. We were able to save the document before choosing to quit and restart.

OpenOffice.org has support for the Java runtime, so you can run Java and JavaScript if required. A language similar to Visual Basic for Applications is also incorporated, and VBA macros are converted when you load existing Office documents.

Although this language is not completely VBA-compatible, it's near enough for most macros. When you go to Open, Save, or Edit an existing document with OpenOffice.org, it asks you if you'd like to keep the original VBA code.

OpenOffice.org also has pleasingly meagre hardware requirements: on the x86 platform it will run acceptably on a Pentium processor with 64MB of RAM, although a Pentium II (or higher) with 128MB will set it soaring.

One of the biggest criticisms of StarOffice 5.2 was the resource-intensive desktop overlay which commandeered the OS desktop to provide quick links to StarOffice's components. The huge overhead took a performance toll on even the gruntest machines. Thankfully, OpenOffice.org has forgone the quasi-desktop appearance in favour of a more modular approach.

AUTOPILOT

On running OpenOffice.org for the first time, you're prompted to locate addresses for the internal address book. Data can be imported from Mozilla/Netscape, Outlook and the Windows Address Book, making the migration of contacts a painless exercise.

As with StarOffice 5.2, an AutoPilot launcher provides quick access to each of the suite's applications — opening an existing document, creating a new document from an existing template, or creating a new template. You can double-click on an icon in the system tray to bring up the New Document window at any time.

WRITER

Some of Microsoft Word's most appealing editing features are mimicked in Writer. This is the OpenOffice.org word processor, which includes an automatic completion of words and phrases and auto-correction of spelling mistakes. Unfortunately, there is no Australian language dictionary for OpenOffice.org so you'll have to run American/English dictionaries. The current thesaurus feature is far from complete, and often suggests inappropriate replacement words. There's also no grammar checker.

The tool that we missed the most was a word counter, but we were able to code one in less than five minutes using the macro editor. As OpenOffice.org is an open source project, we anticipate many additions and modifications will be released in the coming months.

The main window of Writer features toolbar icons that are similar to those employed by Microsoft Office — along with shortcuts and pull-down menus — therefore learning your way around Writer only takes a few moments.

Unfortunately Writer has also picked up one of the most infuriating features of Word: it has its own animated assistant which ranks right up there with Clippy and Jar-Jar Binks on the annoyance scale. If OpenOffice.org decides that it wants your attention while you are busy

SO WHY BUY STAROFFICE 6.0?

While StarOffice 6.0 contains few advantages for the personal or home user, it's worth considering for the business environment.

Being an open source project, there's no direct telephone support for OpenOffice.org.org. If something goes wrong, you're on your own — unless you're willing to trawl through discussion archives in the hope someone else has had the same problem. On the other hand, StarOffice 6.0 comes with telephone support.

And while the core applications are almost identical, StarOffice ships with a library of templates missing from the OpenOffice.org package.

The biggest benefit is that StarOffice 6.0 includes database support for dBase files and queries.

One strike against StarOffice 6.0, which could pose a problem in mixed-platform businesses, is that there's no Mac version.

typing, a little light bulb icon flashes in the bottom right hand corner of the screen. At least it's easy to disable!

CALC

OpenOffice.org's take on Excel is Calc, and this spreadsheet contains so many similar features to Excel that you'd hardly notice the difference. Support is included for the common functions, such as auto-sum and auto-format. Calc can address up to 256 worksheets per file, and enables conditional formatting and goal-seeking.

Excel's pivot tables are also mirrored in DataPilot, which provides a number of spreadsheet functions for power users. If your spreadsheets contain byzantine macros there's a chance that they won't work perfectly, but at this early stage support appears to be solid.

IMPRESS

The presentation component of OpenOffice.org, Impress, is a worthy alternative to Powerpoint. It features a number of transition effects, speaker effects, and HTML output. Impress also interacts closely with Draw, the OpenOffice.org drawing application, which can be used to generate vector graphics. You can use the Draw module to add lines, boxes, ellipses, and 3D shapes. The range of symbols isn't as complete as those provided by Powerpoint, but there is a variety of arrows and lines available, and you can animate objects.

Even at a modest price, OpenOffice.org would be solid value for anyone who needs compatibility with Microsoft Office documents, hardware overhead and the advanced functionality of Office. The fact that OpenOffice.org 1.0 is free is truly astounding.

Matt Overington

OpenOffice.org 1.0 is included on this month's cover CD. You can also visit www.openoffice.org for more information and to download the source code.

<< Details

Contact OpenOffice.org
Online

www.openoffice.org

Price Free download

Verdict ●●●●●

THE POSSIBILITIES ARE INFINITE

FUJITSU

The World's Lightest Notebook[†]



The mobile colour scanner makes a great companion with the handheld sized LifeBook P-1030. The mobile colour scanner is sold separately.



Personal. LifeBook P-1030

- Lightest Notebook In the World[†] (880g)
- Transmeta Crusoe™ TM5500 (700MHz)
- Built-in LAN/Modem/External Display Connector
- Ultra-long Battery Life
- One-touch Email Alert Button
- Designed for Microsoft® Windows® XP



[†] Lightest Windows® PC in the world with Crusoe™ processor (source: Fujitsu, Oct. 01)

Brilliant. LifeBook B-2562

- Mobile Intel® Pentium® III processor 700MHz - M supporting Enhanced Intel® SpeedStep™ technology (Low Voltage)
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- Built-in LAN & Modem
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The rotational touch screen allows smooth delivery of one-to-one presentations.

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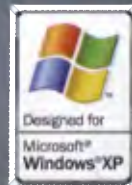
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NITRO GLISTENS

You've heard about the new Northwood CPU. Now see it in action inside a workstation-class system from independent vendor Xenon Systems.

In years gone by, any hefty PC was dubbed a server or workstation and most computer stores were selling them. Now most workstation vendors have been consumed by the big name, big price vendors, such as IBM, HP/Compaq, Dell, Intergraph and SGI. One of the few independents left on the scene in this country is Xenon Systems, which specialises in x86 graphics workstations.

The Nitro 650 is the flagship of Xenon's single CPU models, using none other than Intel's champion Northwood-class 2.53GHz Pentium 4. The monolithic black full tower case looks the part, down to the sliding hatch hides

the external drives which include DVD-ROM and CD-RW drives.

Upon internal inspection, you wonder why the full tower was used, as mounted inside is a tiny Intel Micro-ATX motherboard based on the Intel 850E chipset. You could be forgiven for thinking that it's too small for the case but Xenon says the board in the machine we reviewed is in fact an engineering sample. It fits, but leaves the lowest three expansion brackets without any expansion slots. There are only three PCI slots but, thankfully, networking and sound are provided on the motherboard so the slots can be freed for other expansion cards.

The RAMBUS memory banks are populated with 512MB of RAM. Apart from the optical drives, storage is confined to a single Seagate Barracuda ATA IV 80GB 7,200rpm drive. Xenon has partitioned it into two — one for system essentials and the other for staging whatever projects the user is working on. If further storage is required, the case has ample room for a second platter in the drive cage and another slung underneath the frame of the cage.

The Northwood-class 2.53GHz Pentium 4 is Intel's current flagship at the time of printing. It's the fastest and most expensive mount in the stable and unleashes the full potential of the Northwood CPU by accelerating the frontside bus speed from 400 to 533MHz. The new chipset also incorporates USB 2.0 on board.

Then there is the graphical capabilities. The Nitro 650 is served by the impressive mid-range professional-level ATI FireGL 8800 graphics adaptor card (reviewed on page 42). With this card in place the Nitro 650 turns into a platform suitable for some of the most exacting graphical tasks assigned to a PC.

Benchmarks performed show that the Nitro 650 scored an excellent 64.5 Winstone units across a typical range of normal office software applications. The Gigabyte GA-8IEXP (reviewed on page 121) using a 2.4GHz Northwood CPU but operating its FSB at 533MHz managed 61.6 Winstone units.

The OpenGL standard benchmark Viewperf 6.1.2 shows the Nitro 650 rates favourably with some name brand workstations at the lower end of the price scale which also use the FireGL 8800 adaptor. Official Viewperf benchmark scores can be found at www.specbench.org.

Normally Xenon does not bundle the Nitro 650 with a monitor. Customers seeking this type of workstation usually have particular requirements and preferences when it comes to displays. However Xenon does offer an optional 18in flat panel display to go with the Nitro if desired. Customers should appreciate this flexibility.

As this is a professional-level machine, it is reflected in the price tag. However, the pay-off is that Xenon has plenty of expertise that it can pass on to its customers. This know-how spans areas such as building the hardware, as well as offering advice on software requirements for 3D modelling, animation and engineering.

David Lin

<< Details

Contact Xenon Systems

Phone 1300 888 030

Online www.xenon.com.au

Price \$4,995

Verdict ●●●○○

THE POSSIBILITIES ARE INFINITE

FUJITSU

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GRUNT to GO

With the superb NVIDIA Quadro 4 500 Go GL GPU, Dell's Precision M50 is a savvy mobile option for creative road warriors.

One odd thing about portable graphic workstations is that you hardly ever hear about them. You rarely spot them on store shelves and advertising has been fairly low-key.

That said, grunt-on-the-go for those not tied to an office should be a big selling factor these days. Think of all those engineers, Web designers, architects, and 3D modellers zipping around town still linked to their company's network. A graphics workstation in the modern economy is an increasingly smart buy.

Dell's Precision M50 boasts impressive specifications and represents the pinnacle in the portable computer food chain. Looks-wise the M50 is not a machine to make heads turn, the charcoal-coloured chassis is similar to that used with Dell's Inspiron range of performance notebooks. The unit weighs in at approximately 3.4kg.

The 15in TFT is a special grade of display offering improved brightness, resolution and viewing angles. Its native resolution is 1,600 x 1,200 pixels

which surpasses the capability of most 17in CRT units.

There is a modular drive bay at the front of the notebook which is occupied by a floppy drive. On the left side is the Toshiba DVD-ROM/CD-RW combo drive, S-Video out and ports for modem and Ethernet. The left side holds a pair of PC Card slots, audio ports and a FireWire port. The back holds the parallel, serial, external VGA, PS/2 keyboard or mouse, USB and docking ports.

Opening the clamshell can occasionally be tricky as the latch is quite sticky. There are both trackpoint and glidepad pointing devices, a good 82 key keyboard, generous wrist-rest and only two buttons for power and Dell Direct Access utilities.

Under the hood lies an Intel Pentium 4-M running at a clip of 1.8GHz. This makes the M50 the most powerful portable machine, in terms of sheer processing power, so far seen by APC. This power does come at a cost, as Dell has seen fit to install a dual-fan cooling system inside the chassis. The primary fan runs as normal, but the secondary fan kicks in as soon as the temperature threshold is crossed. Prolonged running of the M50 on the Lab benches had it running almost too hot to touch on the underside. Backing up the Pentium 4-M CPU is the 845MP chipset and a massive 1GB of DDR memory. Main storage is provided by a 60GB IBM Travelstar drive running at 5,400rpm.

Running the Precision M50 at native resolution proved painful in regular office applications. 1,600 x 1,200 pixels on a 15in display means a huge desktop space and tiny icons. Yet throw any visual application at it and the M50 comes to life, thanks to the NVIDIA Quadro 4 500 Go GL GPU. Just as the GeForce family has gone from strength to strength in consumer graphics, NVIDIA is making people sit up and take notice with the Quadro range in the professional graphics area with the same high performance, high feature set formula.

Under 3D Mark 2001, the M50 compares favourably with a GeForce4 MX440 on the desktop while in OpenGL, the Viewperf scores were very encouraging. In some MCAD routines, the performance is similar to the FireGL 8800 card (reviewed on page 42). The high I/O bandwidth of the M50 is steady even at resolutions and colour depths higher than what we normally test at.

The Precision M50 is not the notebook for everyone, but should play a useful role in desktop replacement for the increasing number of non-deskbound workers.

David Lin

<< Details

Contact Dell

Phone 1800 812 393

Online www.dell.com.au

Price \$8,720

Verdict ●●●●●



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PIXEL POWER

This may not look as sexy as some of the other high-end digital cameras, but don't let that worry you. Sony's Cyber-Shot hits the mark with an impressive range of features.

The four megapixel digital camera market has been getting a little crowded lately. Four million pixels used to be the watermark for an exclusive clique where dollars mattered less than image quality. Not anymore. Recent releases such as Sanyo's VPC-AZ1 (reviewed June *APC*, page 38) and the HP Photosmart 812 have brought price-points down below \$1,500 and \$1,300 respectively.

So at \$1,899 where does this leave Sony's DSCS85? Surprisingly, still in pretty good stead. What you get for the extra dosh is better electronics, solid build quality and robust reliability. This amounts to a better all-round photographic experience if more than just the CCD resolution matters to you.

For a start, the body casing is all metal, unlike its cheaper counterparts. The DSCS85's nearest competitors are Canon's award-winning PowerShot G2 (reviewed December *APC*, page 32) and the new Panasonic Lumix DMC-LC5 (reviewed May *APC*, page 30), both within \$100 of its price, and both extremely competent.

Although the Sony measures up in most respects, the Canon manages better exposures in fully automatic mode, and the Panasonic pips it in speed — starting up, shutting down and writing to memory with great efficiency.

Nevertheless, image quality is superb and if you know what you're

doing, the DSCS85's manual controls are where the Sony really comes into its own. Maximum resolution is 2272 x 1704 — on par with that of the PowerShot G2, and a smidgen above the Lumix DMC-LC5's 2240 x 1680.

Shooting at the highest setting however will get you around eight shots before the inexcusably small 16MB MemoryStick, supplied as standard, is filled. For recording images at conventional film proportions, the 3:2 aspect ratio (2240 x 1520) accommodates nicely.

The apparent price advantage of the DSCS85 over the G2 or LC5 is misleading as the latter two ship with 32MB memory cards as standard. As the 32MB MemoryStick is only \$30 more than the 16MB, Sony could have matched its competitors in this respect and still come out a winner on price. For most users of a camera of this specification, the minimum capacity you should go for is 64MB.

In the long term, the fact that Sony's MemoryStick is still more expensive than other flash memory formats such as Secure Digital and CompactFlash should also be a consideration in the purchase decision. The economy only begins to work in its favour if you have other Sony equipment, such as MiniDV Handicams, where certain parts such as the battery and charger (and of course the MemoryStick) are interchangeable.

The other issue of compatibility arises when you try to add an external flash to the Cyber-Shot. It's accessory shoe is proprietary and non-powered, which means you can't just snap on a regular hotshoe mounted flash unit.

The DSCS85's menu system is among the best in terms of simplicity and accessibility. On-screen navigation is via a four-way toggle switch that you push down in the centre to make a selection. Quick access features such as aperture and shutter speed are accessible through Sony's trademark jog-dial, once you have selected the appropriate shooting mode.

Like most recent digital cameras, the DSCS85 doubles its duty as a video camera, albeit in small clips of 15 second bursts at a resolution of 320 x 240, or 60 seconds at a resolution of 160 x 112. The additional MPEG EX (Extended) mode accommodates video recording directly to the MemoryStick until it reaches full capacity.

The black, chunky body design is arguably not as sexy as the L-shaped DSCF707. And the decision to opt for a look resembling a 35mm compact than a high-end digital camera is a tad retrograde. Having said that, the ease of use and extensive array of functions, controls and features far outweigh any minor concerns in relation to aesthetics.

Simon Tsang

<< Details

Contact Sony

Phone 1300 137 669

Online www.sony.com.au

Price \$1,899

Verdict ●●●●○



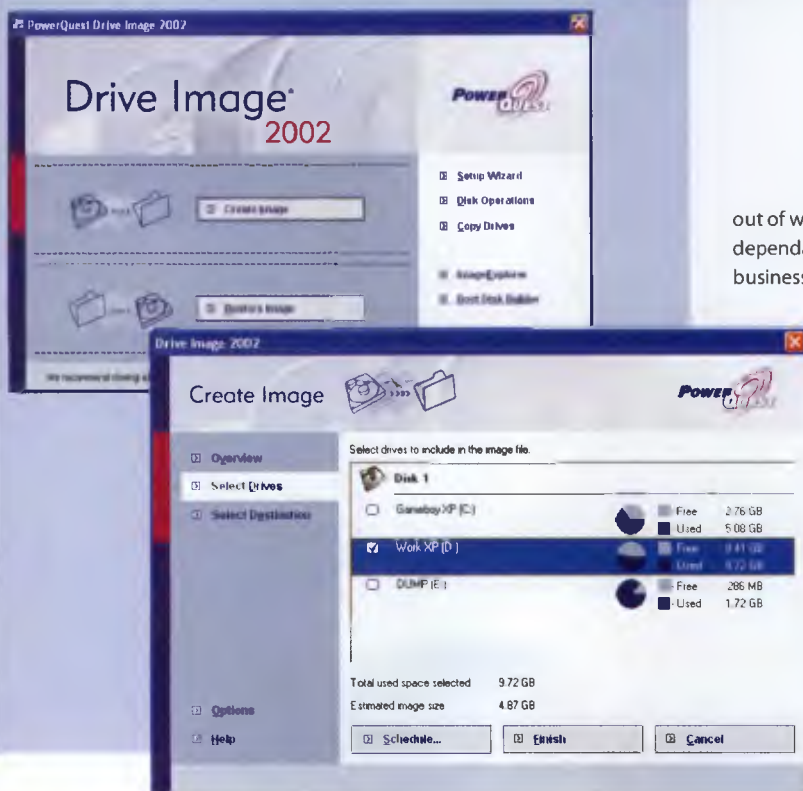


With USB streaming it's easy to link your Handycam to your PC.

The new range of Sony Digital Handycams feature USB Streaming, so you can send video easily to your PC. From there, it's simple to create your own movies with the supplied editing software. Other programs like Microsoft® NetMeeting* transform your Handycam into a Webcam, and allow you to share your video over the Internet. Find out more at www.sony.com.au or call 1300 13 SONY (7669).

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BACKUP PLAN

With new imaging technology added, the Drive Image 2002 is a viable data backup and recovery tool. However, enterprise users may find it slow for network service.

Data. It's those ones and zeroes stored magnetically on your hard disk which mean so much. The integrity of those digital bits that can mean the difference between valid and corrupt data, system success and failure, and for business users in particular, riches and ruin.

PowerQuest's Drive Image 2002 includes "new imaging technology" which purportedly allows you to create and restore drive images while running in Windows. This is supposed to apply to non-system partitions; otherwise the PC still needs to be booted to DOS to allow the copying of Windows files.

APC put Drive Image through its paces in both Windows 2000 and XP environments. Testing revealed that even when backing up a non-OS partition (and thus, not affecting any system files) the program forced a system restart and the process commenced in a pseudo-Windows DOS environment. This is a bit disappointing considering the promise made in the manual. However, all misconceptions aside, the software remains quite simple to use.

The menus are clean and easy to navigate. This is key, and takes confusion

out of what could otherwise be a real headache of a task. After all, taking dependable backups of important data or a vital system drive is serious business, and not one warranting any unnecessary complications.

Supported hardware includes SCSI and IDE drives of most file system types, in addition to CD-R/W, Zip and Jaz drives connected by SCSI, IDE or PCMCIA. You may also elect to backup to, and restore from, a network drive. The latter enables drives and partitions to be saved onto a shared drive in a server or another workstation. It's a good idea and one which would find popularity in a small network environment or a computer R&D lab where PCs might require regular rebuilding. It was surprising to find that this function also requires a restart to a DOS session, even for a simple data drive backup.

When rebooted with either a prepared floppy diskette or by means of an automatically configured temporary boot-up file, Drive Image initiates the network login and then launches into the Backup or Restore procedure it was instructed to prior to the reboot. The easy wizards help set-up all the necessary parameters to log into a network from DOS mode, provided you have a driver disk for your particular network adaptor.

Even on a PC fitted with a 10/100Mbit/s NIC, Drive Image defaulted to 10Mbit/s — resulting in an actual data rate of a sluggish 1MB/s. This makes for almost bearable performance if you're moving only a few hundred megabytes of data. But for an installation of Windows XP with all the usual applications, (adding up to about 3GB), it can take a painfully long time.

From a time management perspective it is much more chronologically viable to backup a full system drive to a separate partition on the same drive — which Drive Image will create for you — or onto another disk in the same computer. That way the only speed restriction is that of your IDE or SCSI bus; normally in the range of 60MB/s minimum.

If you have a CD writer or re-writer it's very easy to use it as your backup drive — Drive Image automatically spans the data across as many CDs as it takes and is independent of what CD writing software you otherwise employ.

The speed is once again limited by the transfer rate of the writer, but tests showed that it was no slower than if you were to burn CDs within Windows with normal recording software.

It's also worth noting that rewritable CDs should be erased of all data before being pressed into service with Drive Image, otherwise you will find yourself stuck in DOS mode with error messages asking for a blank disc.

Drive Image's ease of use and friendly menus make it an attractive purchase for SOHO and personal use. And the CD option could prove invaluable for quickly building up workstations from a system template.

Ben Menge

<< Details

Contact Quadtel Marketing Results

Phone (02) 9899 5888

Online

www.marketingresults.com.au

Price \$99.95

Verdict ●●●●●



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ALL-ROUND ENTERTAINER

More versatile than a Tricorder, and probably more entertaining too. Sony's new CLIE NR70VG takes the Palm OS to yet another level.

Sony clearly sees the role of the handheld as more than a glorified organiser, opting for full built-in multimedia capabilities over Palm's "keep it simple" approach. The philosophy behind the NR70 is a handheld that you continue to use for leisure after working hours.

The NR70 is an absolute stunner. Clever industrial design coupled with uber techno-geek bells and whistles — clamshell casing never looked so good. Flip the top half open and you're greeted by a brightly-lit 320 x 480 resolution colour display complete with an onscreen "virtual" Graffiti writing area that can toggle to an onscreen keyboard. Depending on the application, the Graffiti writing area can be minimised to make full use of the lush display.

The real wow-factor comes into play when you twist the display clockwise and snap it down to the closed position again to form a full-screened tablet-style handheld. The display automatically flips around to the correct orientation to match. The only weak point in the NR70's otherwise robust design is the rotating hinge for the display, which gives way to some flex.

Another crowd-pleaser is the built-in rotating digital camera, capable of capturing images at three resolution settings up to 320 x 240. The CLIE

Camera utility gives you control over such things as white balance and brightness, and the photos are remarkably good given the modest hardware specifications.

The bottom half of the NR70 contains four shortcut buttons to access Calendar, Address Book, Tasks and Memo as well as scroll buttons. Below these buttons is a highly compressed physical QWERTY keyboard. Its circular soft-padded keys require a fair amount of pressure to register, which prevents accidental keystrokes, but at the same time impedes any effort to type quickly. For all its good intentions, the keyboard is difficult to adapt to, and offers little in terms of speed advantages over Graffiti.

Sony has upgraded the standard 33MHz DragonBall CPU in previous CLIEs to a 66MHz which, apart from generally speeding up most applications, helps the camera's refresh rate in the onscreen viewfinder. Memory is 16MB DRAM built-in with an expansion slot supporting MemoryStick media and devices.

The CLIE's standard package inundates you with software — both for the desktop as well as the handheld. Set aside some time to install these as you will have to individually install each application. This is due to the absence of an "install everything" option on the software CD.

The audio features are well integrated, supported by player software both on the handheld and the PC. Sonic Stage 1.1 LE is the jukebox-style software supplied for the PC and can take over your entire music collection for transfer to the CLIE. It can handle MP3, WMA and WAV formats, but converts these to Sony's digitally protected ATRAC3 format when copying to the handheld. However, it only allows for each track to be "checked out" three times before you have to check a track back in from the player.

Thankfully, you can copy an MP3 (but not WMA) file directly to the MemoryStick for playback on the CLIE without needing to convert it to ATRAC3. This is infinitely the better method as it doesn't lock your music collection to Sony's misguided vision of copy protection.

Audio quality is impressive and superior to most portable MP3 players we've heard. A wired remote and headphones are supplied, but the CLIE manages to outclass the ear buds, pumping out more than the pair are capable of handling. Distortion is quite pronounced with the bass and volume turned up but a better headphone set eliminates this trait entirely.

Sony's CLIE Remote Commander application is also a godsend, giving you the power to operate your TV, VCR and DVD player all from a common interface.

While the asking price may at first seem a little excessive, put into the context of Pocket PC handhelds that perform fewer tasks, the CLIE NR70 looks like a pretty good proposition.

Simon Tsang



<< Details

Contact Sony

Phone 1300 137 669

Online www.sony.com.au

Price \$1,349

Rating ●●●●○

Power 4 the Next Generation



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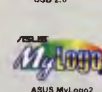
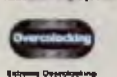
Finally there's a motherboard that gives you everything you need to take computing to the next level. The ASUS® P4B533-V with Intel® 845G chipset delivers everything from Intel® Extreme Graphics for gaming right out of the box, 533MHz front-side-bus support for enhanced performance, USB 2.0 for ultra-fast connectivity, Intel® Application Accelerator support and a wealth of special features to maximize the value of your Pentium® 4 processor.

P4B533-V

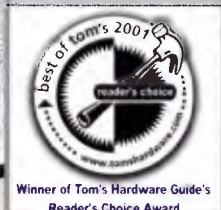


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Distributors

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www.achieve.com.au

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Tel: 61-2-9748-2233
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www.cassa.com.au

* Motherboard may not be exactly as shown. Please confirm specifications with your dealer prior to purchase.

ASUS
ASUSTeK COMPUTER INC.
http://www.asus.com

A beige HiTi 630PS photo printer with a large front-loading slot and a control panel on the right side. The HiTi logo and model name are visible on the top left.

HiTi
Photo Printer 630PS

HiTi 630PS

PRICY but PROFESSIONAL

Say goodbye to messy photo chemicals and head straight into the digital darkroom with the HiTi 630PS printer from Compucon.

The HiTi 630PS printer heeds the call for the home and mobile business market. It's a small, upright unit which takes up very little of your valuable desktop space. The beauty of the HiTi 630PS is that you can either print from your PC via a USB cable or by plugging the CompactFlash or Smart Media card from your camera directly into one of the two slots in the front panel. The contents of your inserted memory card is displayed on the built-in 1.6in colour LCD, and the picture can be printed at the touch of a button.

The LCD screen is, unfortunately, lacking in the resolution stakes and does not compare very well with those found on most digital cameras. The image looks fuzzy at best and is not a crisp representation of what will be printed. You can rotate and change the contrast and brightness of the image, but not a great deal more.

The size format this printer handles is that of standard photographic print paper, 4 x 6in, which will fit perfectly into your photo albums. The paper comes in boxes of 50, along with a colour ribbon to accommodate the same amount of prints. The total cost per print is around \$1.50,

relatively economical considering the speed and convenience at which results are produced.

The pictures are also covered by a clear plastic coating, which is great for protecting your prints against acidic fingerprints which can quickly deteriorate your photo.

Colour reproduction is good; skin tones are accurate and colours are vibrantly reproduced.

The printer's output resolution is 300 x 300dpi, which falls short of most inkjet printers available these days, but this printer is not aimed at the same market. For high resolution digital photographic prints at home we still recommend a good quality inkjet from one of the big names. The 630PS degrades the picture quality by reducing the resolution of all pictures to 300 x 300dpi, regardless of whether you photograph at resolutions of 420 x 680 or 1600 x 1200.

When inspected closely, there are obvious "jaggies" (otherwise known as "aliasing" in graphic design terms) along the edges of everything and these become very obvious in brightly lit photos. However, with darker subjects the edges are a little less obvious. These may not be cause for concern for the average user who just wants a fast, fuss-free solution for printing digital photos. But for the graphical connoisseur this printer is not really the best option. Even if you wanted to (or even could) print on larger paper, the 300 x 300dpi resolution would not be good enough for presentations or an album.

Sales agents and the like will benefit from the 630PS's portability and the independence from a computer — all they need is mains power and the memory card from the camera.

Overall, the results are satisfactory for those who want fast, glossy prints from their digital camera. However its price is a letdown and is not commensurate with the quality of output.

Home users will probably be discouraged by the performance per dollar, but some professional sectors may endure the price to reap the benefits of this printer's convenience.

Ben Menge

<< Details

Contact Compucon Australia

Phone (02) 9417 7166

Online www.compucon.com

Price \$499

Rating ●●●●○



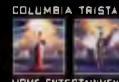
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SO MUCH MORE



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POCKET VAULT

MP3 collections, home video editing and digital music creation have changed the storage equation: demanding speed, plenty of room and, if possible, the ability to easily move these mega-files between machines. What do we want? An external hard drive. When do we want it? Now!

The oddly-named HDD is Iomega's first foray into this market, following the cartridge-based Jaz and Peerless drive systems. Given that Jaz and Peerless now count among Iomega's growing list of orphaned products, we hope the HDD enjoys greater longevity. This 20GB drive measures a pocket-sized

90 x 145mm. An interface adaptor puts another 45mm onto the back panel. The featherweight 90g adds to the HDD's pleasing degree of portability.

As with all Iomega products there's the usual grab-bag of backup software. It's not going to set the world on fire but is easy to use and integrates well with the drive itself.

The drive can connect via USB (1.1 and 2.0) or FireWire, depending on which interface module is supplied. Modules will be available separately so you can kit up your HDD to work on either interface.

USB operation requires the bundled AC adaptor, while FireWire lets the HDD draw juice directly from the 1394 port.

While USB 2.0 is rated at 480Mbit/s, our tests delivered the same reality check we've found in all USB 2.0 devices to date. In the case of the HDD, the best speed we could achieve was 61Mbit/s. While faster than the 7.87 Mbit/s which the HDD recorded under USB 1.1, it's still well short of what the USB 2.0 touts promise. (For more on USB 2.0, see this month's Tech Briefing on page 54).

In its favour, the HDD is compact and fairly well priced. But Iomega is far from the only player on the field, so you'd be wise to shop around and compare the prices, capacities and performance of other external hard drives before you make any decision.

Ben Menge

<< Details

Contact Iomega Australia

Phone 1800 466 342

Online www.iomega.com

Price \$549

Verdict ●●●○○

ATi FireGL 8700 and FireGL 8800

ON FIRE

FireGL has earned a reputation as a fast and stable accelerated OpenGL. The 8700 and 8800 models are the first to bear the ATi moniker but they differ somewhat from their predecessors.

Previous incarnations used GPUs from other manufacturers, but these cards have adopted ATi's own silicon, the Radeon 8800LE (FireGL 8700) and the Radeon 8800. The FireGL 8700 is targeted at entry-level workstations and the FireGL 8800 is a mid-range candidate.

Price aside, an important factor for consumers is the OpenGL capability. Virtually all cards, and most common applications, support both DirectX and OpenGL APIs, and the application will offer the user a choice.

However, the accelerated OpenGL

capabilities are the domain of the professional cards used by engineers, architects and 3D modellers.

Experienced punters might recall ATi tendencies like unstable software. Some releases had a "driver du jour" where you could download a new driver release almost daily. This is not the case with the FireGLs. All development has been retained by the German team that worked with previous FireGL products.

The cards are relatively nondescript looking and are both dominated by their GPUs hidden beneath a modest heatsink/fan. Almost all other aspects of the boards mirror each other apart from extra memory chips mounted on the 8800. The PCB is good quality, and there are no RAMsinks. Both come with dual VGA and DV outputs.

In performance, neither card peaks under normal DirectX benchmarking. Testing with Viewperf however had the FireGL 8800 come up trumps.

When push comes to shove, if you need the power, splash out and opt for the extra grunt of the FireGL 8800.

David Lin

<< Details

Contact Xenon Systems

Phone 1300 888 030

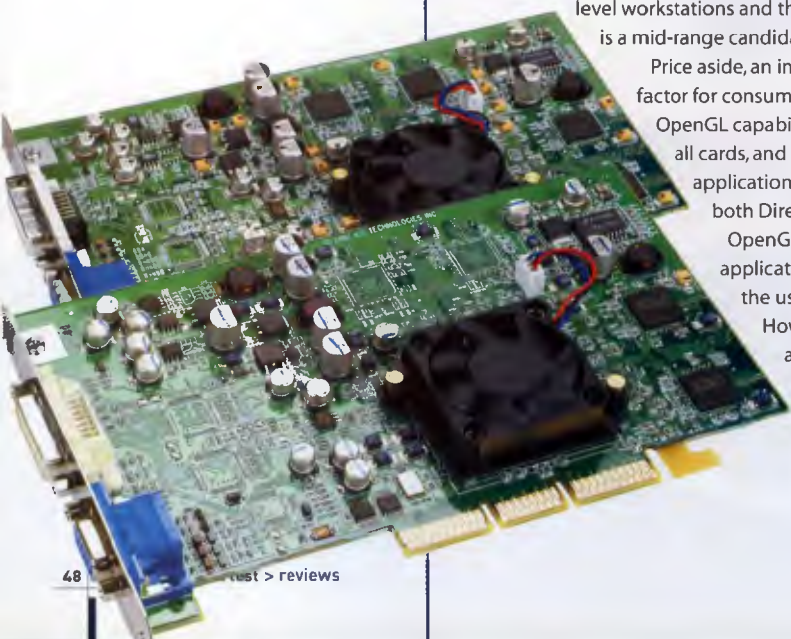
Online www.xenon.com.au

Price FireGL 8700: \$985

FireGL 8800: \$2,015

Rating FireGL 8700 ●●●○○

FireGL 8800 ●●●●○





Finished



Not quite

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Distributing or archiving valuable work on CDs is fine, once your projects are completed. However, constantly burning CDs while you're still working on your documents is a slow and tedious process that also burns time and money. This is why you should use Zip®. A Zip drive is the quickest and easiest way to save and back up all versions of your work whenever you feel the need to. It means that valuable projects that are on-going



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I CAN HEAR MUZE-IC

The Muze has all the standard functions that we've come to expect from portable audio players, including repeat and random play, automatic power-off, and a USB connection.

It also features an equaliser with five presets, and an internal microphone. University students, for example, could record lectures using the voice recorder, and then archive them on a hard disk at home. At exam time, each lecture could be played back for revision.

One noticeable aspect of the Muze is its diminutive size. It's less than 6 x 4cm, and weighs in at 27g without a battery installed. The power consumption is remarkably low, managing to play for seven hours on a single AAA battery.

The installation CD contains drivers and little else, but this isn't a problem. The Muze is so easy to use that it doesn't require an interface like Sony's MG Jukebox. We tested the 128MB model, which has two 64MB

removable disks, a 64MB version of the Muze is also available. The contents of the memory cards can be viewed through Windows Explorer.

The player has no copyright management and you are free to use the player to transport your MP3s. You aren't restricted to MP3s, though. You can use the Muze as a storage device to transfer Word documents, videos, or any other file between computers.

One major complaint is that the Muze breaks up the 128MB of internal memory into two 64MB drives under Windows. It means that you have to fill each half of the memory individually. As a result, you won't be making most efficient use of the space.

File transfer between the Muze and a PC is a slow 2.7Mb/sec (approx.), but having to wait a few moments while your songs copy isn't too frustrating.

The sound quality is good, battery life acceptable, storage space plentiful, and form factor tiny. If you're looking for a portable player with plenty of flexibility, then the MStation Muze is a good bet.

Matt Overington

<< Details

Contact MStation

Phone 1300 131 035

Online www.mstation.com.au

Price \$375

Verdict ●●●○



Actual size ▲

EXTEND YOURSELF

Portfolio can catalogue almost any file but it's primarily used with graphics, and displays thumbnail images for most popular formats (but not PageMaker for Windows). Text files can be indexed, although text within a PDF file is not indexed by the Mac OS version.

Cataloguing and indexing can be tedious, but Extensis has paid attention. Keywords and descriptions can be applied to batches of files:

Portfolio reads metadata stored within files, and optionally treats file and path names as keywords. This is a real time-saver when files are already carefully organised. Catalogues can be shared, though Extensis recommends Portfolio Server if ten or more users share a catalogue.

Retrieving files is easy: type a search term into the

main window and press Enter. The Find command is needed when searches span multiple catalogues or involve multiple criteria (e.g., Client is "APC" and Created after 31/12/01). Either way, items found can be dragged from Portfolio into the document you're working on. The lightweight Portfolio Express program included in the package is more convenient for this part of the job than Portfolio itself, as Express provides a window that floats above whichever application you're using.

If you try to drag and drop an item stored on an unmounted CD-ROM, nothing happens: there's no error message, and no request to mount the disc. We consider this a major shortcoming, as cataloguing a CD-ROM collection of photos and graphics is an obvious use for Portfolio, but Extensis does not regard this as a bug.

Items selected in Portfolio can be prepared for burning onto a CD, complete with a copy of Portfolio Express. Alternatively, they can be turned into email attachments or catalogue-style Web sites based on customisable templates.

Stephen Withers

<< Details

Contact Pica Software

Phone (03) 9388 9588

Online www.pica.com.au

Price \$515 (upgrade \$280)

Verdict ●●●○





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Forget lining up originals on the scanner glass. You can place them more or less how you like, and Canon software ensures your finished

scans come out perfectly straight. It automatically creates a separate file for each image. And for bulky objects like books, some models have a spring-loaded Z-Lid to hold them flat.



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\$199^{RRP}



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Bit-depth is essential for high quality. The number of readable colour bits affects colour accuracy, and the detail visible in bright highlights and dark shadow. So all Canon scanners are capable of at least 42-bit input, and many offer 48-bit. (You might say anything less would be a two-bit scanner.)



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\$699^{RRP}

CanoScan FS4000US
\$1499^{RRP}





SPEED TEST

Matt Overington gives you the good oil on the revved-up versions of USB and FireWire.

The quest for speed isn't limited to processors, and quickly moving data to and from your PC without causing a log-jam has long been a focus of system engineers. Two key technologies emerged from this search: USB and FireWire, also known as the IEEE 1394 standard.

Both interfaces boast similar benefits. Plug-and-play connectivity eases (although not entirely eradicates) the hookup hassles associated with serial and parallel bus systems. And widespread vendor adoption ensured that the technologies quickly reached the critical mass needed to become standards within the industry.

But they were never meant to be competitors. With a peak throughput pegged at 12Mbit/s, USB 1.1 is suited only to low-speed devices ranging from keyboards and mice to scanners, handhelds and digital cameras. Anything more taxing, such as Zip drives and CD burners, quickly proved beyond its pace.

FireWire's forte, on the other hand, is raw velocity. With the redline rated at 400Mbit/s it is the natural choice for connecting high bandwidth peripherals such as DV camcorders and external hard disks.

But this neat complementary relationship is about to change. Upgrades to both technologies substantially boost their speed, setting up a new interface race that changes the way you connect peripherals to your PC.

USB 2.0: FASTER, BUT FAST ENOUGH?

The fact that USB 2.0 offers backwards-compatibility with current USB 1.1 hardware, and has native support from Intel, ensures a rapid uptake from major hardware manufacturers.

Peripheral manufacturers have already released USB 2.0 PCI cards and hubs, while motherboards based on Intel's i845 chipset all ship with

on-board USB 2.0. With a maximum transfer rate of 480Mbit/s, USB 2.0 promises to outpace FireWire. We tested that claim using several external hard disk drives that support both USB 2.0 and FireWire support.

The result? USB 2.0 certainly eclipses its parent, but still takes second place to FireWire. One of the test drives, from Wiebetech, clocked a 400MB set of files at 24.18 seconds via the USB 2.0 bus; FireWire managed the same feat in 20.20 seconds.

IEEE1394B: IT'S FIREWIRE, BUT EVEN HOTTER

With its data ceiling set to a 800Mbit/s, and future extensions to 1.6Gbit/s and a mind-boggling 3.2Gbit/s, we're hoping that IEEE 1394b gets a name as zippy as its transfer rates. Tags such as FireWire Turbo have been bandied around but for now it's just plain old 1394b, a rose by any name will still blast USB clear out of the water.

IEEE 1394b also benefits from a beefier signal strength sent along the copper cable, which enables devices to be located up to 100m down the line — that's plenty for local area networking and storage applications. There are two magic bullets to IEEE 1394b's higher speed and longer reach. Overlapped pipeline arbitration is how it manages to juggle the priority given to devices connected along the bus.

As FireWire is a multi-master bus system, more than one device initiating transfers can be active in the system. To determine which device is in control and prevent data from becoming mixed up, overlapped arbitration dynamically determines which module is the master. IEEE 1394b allows data transmissions and the arbitration protocol to run in parallel. IEEE 1394a however, must alternate between arbitration and data transmission, limiting the total throughput.

Furthermore, IEEE 1394b has borrowed from Fibre Channel and Gigabit Ethernet and added robust control codes and scrambling of both control and data symbols to minimise cross-talk. Known as *advanced data coding*, this ensures that signals fly out of the PC at a higher strength and can travel further before the inevitable attenuation sets in.

Despite these technology advantages, the fact that IEEE 1394 is still not supported on-board by PC motherboard manufacturers will prevent it from gaining a decisive and deserved upper hand over USB.

Apple outraged chip and system manufacturers in early 1999 when it proposed a licence fee of \$US1 per port for FireWire systems. The scheme was dropped, but not before former FireWire backer Intel shifted its weight behind the royalty-free USB standard.

And as APC went to print, Apple announced a no-fee licence agreement with the 1394 Trade Association which grants legal permission for the FireWire brand to be used for all IEEE1394 products. Now, at last, the industry can get on with promoting the technology rather than worrying about what to call it.

More information on both specs at www.usb.org and www.1394ta.org.

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THE CONTENDERS

Mobile phones these days aren't just telephony tools. Manufacturers and telcos alike are betting that data transfer usage such as email and Web browsing will outstrip voice applications in the near future.

Matt Overington and Simon Tsang take a look at two just-released natural-born contenders that sport dual-band GPRS.

NOKIA 6510

SCREEN

Despite a small display, the 6510 has a new high resolution display which can fit up to four lines of text. Illuminated by a soft blue backlight, it's very readable in most lighting conditions and better suited to WAP browsing than previous Nokia models of this size.



Contact Nokia

Phone 1300 366 733

Online www.nokia.com.au

Price \$799

Verdict ●●●●●

EXTRAS

Mobile commerce is one of the new trends we'll see in mobile phone features. Just like e-commerce, there will be concerns over providing personal details on a public network. To alleviate such fears, the 6510 is equipped with a wallet feature where you can store information such as credit card details and have it encrypted for secure transactions via WAP. There's also a voice recorder, countdown timer, stopwatch, and a currency conversion function within the built-in calculator.

ERGONOMICS/AESTHETICS

Nokia's user-interface and menu system is an example for others to follow. The keys are well weighted, sized and spaced despite the tiny size of the phone. Considering Nokia's preoccupation with fashion, the 6510's styling is remarkably subdued and sombre. Aimed at more serious business users, the boxy dark grey shell is a stark contrast to its extroverted cousin, the 6310.

ENTERTAINMENT

FM radio is built-in and an earbud headset is provided. 20 presets let you store and label your favourite stations. Nokia is never short on games, and their selection in the 6510 includes Snake II, Pairs II, Space Impact and Bumper (pinball).

CONNECTIVITY (INPUT/OUTPUT)

The supplied PC Suite software for Windows allows you to control and manage various functions via the 6510's infrared port. In particular, you can synchronise the phone's contacts and calendar entries with Outlook on your PC. You can also create ring tones and graphics from PC Suite and then transmit these to your phone.

BATTERY LIFE

Its rating of 3.5 hours talk-time and 288hrs standby is entirely realistic. The tiny 750mAh lithium ion battery does wonders with retaining charge, even when the FM radio is in constant use. It's definitely a model suited to heavy users and long stints away from the charger.

apc
EDITOR'S
CHOICE
JULY
2002

THE VERDICT

If used in conjunction with an activated GPRS account, both phones are capable mobile business tools. However, the 6510 manages to better the V70 in just about every Face-Off category. Where the Motorola has put form before function in the V70's

design, Nokia has shown remarkable restraint with the 6510 and simply made the handset accessible and sensible in its feature set. The 6510 looks and works like a professional rather than a fashion accessory.

MOTOROLA V70

SCREEN

The V70's screen colours are inverted, with white text on a black background. The result is quite stunning, but extremely hard to read. The backlight is blue, which renders the text difficult to read under mottled shade, and impossible to see in full sunlight. Despite there being room for three lines of text plus icons, the screen is hardly designed for going online.

ENTERTAINMENT

Unlike the Nokia range, the V70 is thin on the ground when it comes to games and extra functions. You get a mastermind clone, a pong clone and a blackjack game — none of which are particularly compelling. The games are also quite hard to play due to the small screen size and poor contrast. If you want music on the move, you'll have to purchase an optional FM tuner headset for \$99.

CONNECTIVITY (INPUT/OUTPUT)

The V70 features support for dual-band GPRS Class 8 WAP, although the absence of triple-band GPRS should only deflate the interest of hardcore global roamers. While there's no IR port, a USB port lets you sync with PC applications, provided you buy the optional TrueSync software.



Contact Motorola

Phone 1300 368 398

Online au.motorola.com

Price \$1,199

Verdict ●●●●○

EXTRAS

The user interface is appallingly hard to navigate, and there is an annoying lag when you are browsing the menu items. The subtlest problem with the design is that the antenna's reception is sabotaged by its location. When you answer a telephone call and rotate the cover to the open position, reception drops noticeably because the aluminium cover panel interferes with the signal.

ERGONOMICS/AESTHETICS

Small enough to fit into the coin pocket on a pair of jeans, a process aided by the rounded corners, the V70 is a real head-turner. Yet the keys are large enough to make SMS messaging viable, and the blue backlight for the keypad is vibrant. However, the rotating cam can fill with dust and grit.

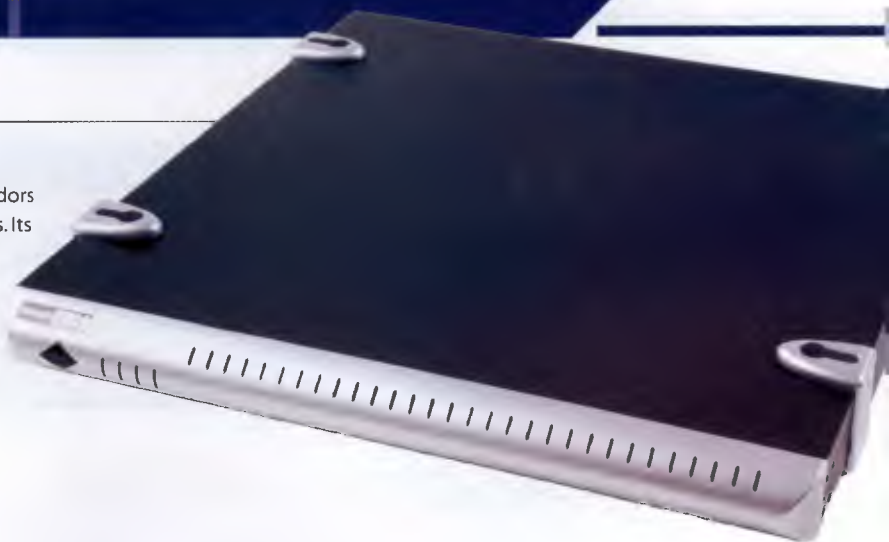
BATTERY LIFE

Despite relying on a small 430mAh Li-Ion battery, the V70 will last more than 120 hours on standby without recharging. The talk time is a little over three hours per battery, but thankfully Motorola provides two batteries. If you're travelling, you'll appreciate the spare.

IT'S A RAID

Iomega has joined the growing list of hardware vendors spruiking Network Attached Storage (NAS) solutions. Its drives are aimed at small-to-medium business and feature hot-swappable RAID 5 and RAID 5+ disks. The line-up is well-priced, with the 120GB NAS A300U ticketed at \$3699. The range peaks at the 480GB model P410U.

www.iomega.com/anz



WHAT'S IN A NAME?

On name alone, the difference between Pioneer's DVR-A03 DVD rewritable drive and the new DVR-A04 (\$999) might seem almost negligible. But the A04 offers significant improvements over the previous model. It supports buffer underrun protection for DVD and 2X DVD-R burning, so you can burn a full disc in approximately 30 minutes. However, one caveat: as Pioneer is a member of the DVD Forum, the A04 can't play discs burned with the rogue DVD+RW format. Until that war settles down and a single standard emerges, you might want to hold out.

www.pioneeraus.com.au



BIG BROTHER

Toshiba took its first step into the handheld market just six months ago, with the launch of the Windows-based Pocket PC e570. The unit's winning combination of small form factor, elegant design and dual card slots (for CompactFlash II and Secure Digital) quickly won it a place in the hearts, pockets and purses of the digerati. Now Toshiba has gone one better, with the just-announced e740 (it didn't even have a price tag when we went to press). The e740 employs Intel's 400MHz XScale processor, which is a sizeable leap from the e570's 208MHz engine. Memory remains pegged at 64MB, but the biggest boost is your choice of either Bluetooth or 802.11b wireless LAN built-in.

www.toshiba.com.au



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STEER CLEAR

An F1 team wouldn't skimp on steering controls, and neither should PC racers, says Justin Kranzl.

It's all very well having a top CPU and video accelerator pushing realistic visuals at eye-melting speeds, but if you're relying on a mouse or keys to negotiate turn one with 20 F1 cars snaking behind, you're just not getting the full experience. Which is where steering wheels come in.

Forget the days of cheap and nasty flimsy devices. Today's wheels offer both fine performance and excellent build quality. With prices for a decent wheel heading well into triple figures, it's not a peripheral that everyone needs, but for dedicated drivers clocking up the miles, it's every bit as compulsory as a decent mouse for first person shooter fans, or a joystick for flight sim fans.

It's important that prospective wheel buyers take the time to shop around. There are some common issues no digital driver should stint on. Build quality is paramount. A racing game can last anything from five minutes to three hours, so you want to make sure the chunk of hardware you're holding on to for that time not only feels right, but also isn't going to self destruct from prolonged use.

Similarly, ease of use is important. If you need to be a mechanical engineer to properly install, calibrate and use a given wheel on your PC, you may well feel better off angling for a job in the pits at Ferrari rather than coaxing your OS into submission.

Sadly, unlike video cards, there is no "GeForce MX" equivalent for wheels. Bargains featuring great performance are rare, and the quality of your experience is largely dependant on what you have to spend.

That said, there are always exceptions to the rule. APC has sorted the front runners from the also-rans and scrutinised a small selection of wheels available in Australia. After many laps and lead changes, there was eventually a clear winner. The green light is on, so let the challenge begin.

HOW WE TESTED

APC testing focused on the consistency of wheel response, how comfortable it was to operate over extended periods of play, and ease of use in a "typical" PC working environment.

What did we test on? NASCAR Racing Season 2002 affords a stiff

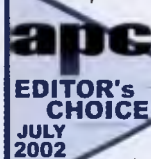
test of wheel endurance around Daytona, while racing at late 60's era Monza and Nurburgring on the aging yet superb Grand Prix Legends is a true measure of steering sensitivity. Finally, Need For Speed: Hot Pursuit was used to test both response and force feedback.



Logitech MOMO Force

Uncompromising quality is the hallmark of Logitech's MOMO, and at this price it should be.

With liberal doses of brushed metal, ball bearings supporting all rotating parts, and a look that humbles the opposition, the MOMO is truly in a class of its own. There is not one aspect of this wheel's build quality, appearance or performance that takes a backward step to its rivals.



For starters, there's the wheel cover — that's real leather you're smelling. In terms of in-game feel it's no more comfortable than a rubber grip but it's this attention to detail that makes this wheel both authentic and special.

More practically, metal gearshift paddles make you forget the lack of a gearstick, their quality and design are at a level beyond the competition.

And then there are the pedals. Constructed of aluminium and mounted on a metal baseplate, nothing else comes close.

If one was to nitpick, the feedback from the Microsoft Sidewinder pedals are firmer, but this is the only blemish on the MOMO, and a minor one at that.

The bad news? The price. Quality does not come cheap, and in this case, the cost is approximately double that of the competition's.

In the MOMO, Logitech's commitment to quality in design seems to have inspired its rivals. Expected to arrive in the second half of the year is Thrustmaster's response, a Michael Schumacher F1 wheel with a very similar design — metal, quality and lots of both. Until such time, the MOMO has the field to itself in Australia.



<< Details

Contact Logitech
Online www.logitech.com
Price \$499

Verdict

- ✓ Superior build quality, outstanding performance, feel and authenticity.
- ✗ Expensive (but oh so worth it).





Thrustmaster Force Feedback GT

Thrustmaster gives top value for money and many control options.

The Force Feedback GT isn't short of control options. In addition to the gearstick, there are left and right gearshift paddles, two 8-way D-pad style control hats, plus there are two buttons on the front of the wheel.

On the track, all initial fears about the feel of the rubber grip that encircles the wheel are quickly dispelled. The wheel was equally comfortable handling 10 hot laps of a NASCAR qualifying session or 50 laps of Grand Prix Legends' Spa — throughout it remained responsive and consistent in its feedback.

The force feedback compensates for a lack of subtlety by kicking like a mule. Those gearshift paddles can be quite wishy-washy in picking up key input — and the pedals aren't up to the Microsoft offering's standard, let alone the mighty MOMO. Even so, there's not much doubt that this is the choice for racers looking for competitive quality at a low price.



<< Details

Contact Guillemot
Online
www.thrustmaster.com
Price \$199

Verdict



- ✓ Decent level of comfort over distances and is excellent value.
- ✗ Quality of the unit is not matched by the pedals.



Microsoft Sidewinder Force Feedback

Microsoft's proven performer sticks to the middle of the road.

The Sidewinder wheel affords comfortable driving on everything but the longest distances, with a slight ridge between the rubber cushioning and the plastic a vague source of annoyance.

Microsoft has to be commended for not only having six fascia buttons and two gearshift paddles, but also a user-friendly "Force" button on the wheel's fascia, making it easy to slap off or on the effect instantly rather than change it via software or in-game.

The real standout for the Sidewinder is the feel of the pedals. Despite some slippage when rapidly booted into action, they excelled in providing positive feedback.

The big problem is finding where the Sidewinder edges the competition. The Thrustmaster has similar quality but is \$100 cheaper. And don't even mention the MOMO — admittedly more expensive but also much higher quality. As such, it's hard to recommend this fence-sitter over its class rivals.



<< Details

Contact Microsoft
Online www.microsoft.com
Price \$299

Verdict



- ✓ Great pedal quality, consistently sound performance across the board.
- ✗ No decisive advantage over cheaper offerings.



Ultra Compact Projectors
Light, stylish and simple to use.
Perfect for presenters on the go.



Networkable Projectors
Deliver powerful and dynamic images across your network.



Plasma Display
Slim and stylish hi resolution plasma screens are available in 32", 42" and a massive 50".



Computer Monitors
Sony has a wide range of award winning CRT and LCD monitors for home or office use.

For all of your
business display
requirements,
look to Sony.



Crunching the numbers

Clem Roberts checks out four leading finance packages that help you take control of your home and business budget.

You work hard enough for your money. You probably work at least two days a week just for the tax-man. So it's up to you to make the most of what's left of your money. Yet even given the arrival of the GST and the BAS, the growth of personal share ownership and the trend towards self-funded retirement, many households and businesses still make do with anything from a shoebox full of receipts to an old-fashioned ledger.

Microsoft and Quicken have put plenty of work into their respective Money 2002 and Personal 2002 packages, starting with helpful setup wizards and slick interfaces. As long as the program supports online banking, share trading and tax preparation, you'll immediately notice the benefits of knowing where your money is, where it's going and what it's doing.

GETTING THE DATA IN ...

Laborious but largely unavoidable, data entry is a task that a good package will render as painless as possible. The learning curve and training requirement for competency should be minimal. It should be difficult to inadvertently enter the wrong details and the need for repeat entry has to be absolutely minimal. Better still, if relevant data exists in digital form elsewhere, you should be able to import it into your accounting software with a minimum of fuss.

... AND GETTING IT OUT AGAIN

If your business makes lots of transactions, say more than five to ten a day, or if you have more than five to ten profit centres to report on regularly, then a given package's reporting mechanism should be a key area of interest for you.

HOW WE TESTED

APC set up a new user for personal finance software, and a new company for business accounting software. We then combined real data with bank statements and share prices we sourced online, and produced reports. Two-five-year-old machines running different

operating systems were used for the software.

We considered how an untrained person would go using the personal finance software, and how a trained accounts/bookkeeper with little or no experience of the business software would cope.

Ideally, a package will allow you to check your cash position or liquidity at a glance. You will also want quick, detailed information in all areas of your records at least two years back, and in certain instances, even further. A good package should also be able to automate the generation of professional-looking correspondence to debtors without requiring time to be devoted to mastering the finer details of the mail merge function.

BUSINESS ACTIVITY STATEMENTS

At tax time your accountant will need to see the year's BAS statements and work out how they were produced. They will need to locate, examine and amend individual transactions. They should be able to get to profit and loss and balance sheet reports without knowing your software well, and may need to import your data into their own accounting software. Any changes made should be incorporated into the file you work with daily.

FOR THE BIGGER BUSINESS

If your needs extend past those of a small solo operator, and into the realm of a PC network, the standard editions of QuickBooks and MYOB might prove too limiting. That's why both are available in more powerful Pro and Premier versions.

MYOB's file structure and size make it impractically slow across networks, and the program is out of its depth when it comes to tracking changes made by user and user-specific security settings.

QuickBooks Pro, on the other hand, adds multi-user capabilities and more. Microsoft Outlook contacts can go straight into QuickBooks Pro and sending reports into Excel brings across formatting, formulas and functions. And when used with Office XP, special SmartTags let you enter a customer name in Word and call up a list of outstanding invoices from Quicken — easier than a mail merge!

Just these three features would make the extra \$400-odd premium over QuickBooks Plus worth it for many businesses.

FIRST STEPS

Preparation is vital for businesses moving to a software solution. You'll need your basic business details and previous financials, as well as your asset inventory and any depreciation schedules. Also, identify your main income and expense categories and their GST treatment. It's a lot of work, but the benefits will quickly mount up.



Microsoft Money 2002

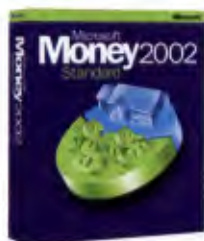
A simple tool for managing personal finances but not really suited to Australian tax reporting.

Setting up Microsoft Money is easy, and operation of the program is conducted via an interface that will be familiar to anyone who has used a web browser. While the standard interface has more links to shopping and Microsoft partners than you need, there are several templates to give you the look and functions you want.

Once you've entered your bank account details, balances are on the opening screen, showing your cash position at a glance. Setting up share trading accounts was almost as easy as setting up bank accounts, with links for the ASX code and current price of your shares. This is very intuitive and with a skew towards ease-of-use rather than too many features.

Money 2002 offers mixed results. The relatively limited find functions and reporting are balanced by a debt reduction wizard that produces results surprisingly fast.

Showing its US origins, Money 2002 outputs a tax file which is not suitable for Australian tax purposes. Users are forced to take the simple, but niggly, step of manually transferring information to the Tax Pack's format.



<< Details

Contact Microsoft
Phone 132 058
Online www.microsoft.com/australia
Price \$65

Verdict

- ✓ Out-of-the-box simplicity.
- ✗ Not suited to Australian tax reporting.



Quicken Personal 2002

In the under \$100 category, this is powerful and packed with time-saving, real-world features.

Despite displaying more functions than Microsoft Money, setting up Quicken Personal is logical and easy. Most Australian bank names are already hard-coded into the software and links to your institution's web site appear when you specify where you conduct your banking.

For automatic share quote updates you need to pay a subscription fee, which is worth it for the convenience. Once you've entered your shares and income and expense categories, they can be linked to Australian Tax Pack questions. You can also verbally answer the questions in the software if need be.

Without leaving Personal 2002 you can use your bank's Web site to export transactions and then import them into your software. Personal 2002 recognises repeated transactions on your downloaded bank statements and asks if you want to have them recorded automatically. This saves a lot of data-entry time.

And an unusually powerful find-function finds virtually anything, anywhere in the program.

If you also use the ATO's software, you can feed the data directly into the form on the ATO Web site to lodge your own return. Otherwise, the answers to the Australian Tax Pack questions are printed out for you.



<< Details

Contact Quicken
Phone 1300 784 253
Online www.quicken.com.au
Price \$79.95

Verdict

- ✓ Automatic tax reporting.
- ✗ Not intuitive enough.



6

One strike and your PC's out

Protect your PC and data with APC's NEW desktop power protection solutions



Protect your workstation against 4 daily power problems

It's a fact. A study by IBM proved that your workstation is subject to 128 power disturbances per month, that's roughly 4 per day! Power problems are also the largest, single cause of data loss, accounting for 45.3% of all problems. The best way to protect your valuable PC, data and peripherals from damaging surges, sags and blackouts is with the new APC Back-UPS CS or Back-UPS ES.

These new desktop solutions will continuously condition the power coming into your equipment, and instantly switch your PC and peripherals

to emergency battery backup power during brief power outages without data loss or downtime.

APC recommended worldwide

Trust APC for affordable, reliable, high-performance power solutions. Recommended worldwide by leading IT vendors such as Cisco, Dell, HP, IBM, Sun and Microsoft, APC has received more awards for reliability and innovation than all the other UPS manufacturers combined. When you choose APC, you choose a lineage of **Legendary Reliability™**.



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Telephone, fax, modem and DSL line surge protection protects you PC equipment while online.



FREE auto shutdown software for Windows and Mac OS users: saves files in the event of extended power disturbances.



Enough outlets to protect your PC and peripherals. BK ES: 3 'battery and surge' outlets and 2 surge outlets. BK CS: 3 'battery and surge' outlets and 1 surge outlet.



Standard Australian general purpose outlets for ease of plugging equipment into the Back-UPS ES unit.



Intelligent battery management and auto self tests maximise battery reliability and notifies when battery needs to be replaced.

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Protection

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Protection

Desktop Power
Protection

UPS Management
Accessories

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Don't just make a
digital connection.
Make an
emotional one.

I can... ...connect with family and friends in exciting new ways. Like scanning and e-mailing a photo with a few clicks of a mouse. Or taking someone's breath away with a spectacular panorama.

At Canon, we create cameras, scanners and printers that connect seamlessly with each other – and with you. Opening up all kinds of possibilities.



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Four clicks to print.**

Printing a photo from your Canon digital camera is almost as simple as shooting it.

Unique software lets you add frames, captions and other warm personalised touches.



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There's no need to keep your photos in a shoebox. Canon makes it a snap to capture, organise and email pictures of every description – whether from your digital camera, or scanned from old slides or negatives.

*Get creative. Get organised.
ZoomBrowser helps organise your photos.*



Fabulous, fast, fun. Print up to 6" x 4" postcard prints directly from PowerShot cameras.¹



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You can try to describe a panoramic landscape to someone. But it's much more impressive to unroll it on the table in front of them. And you can with a Canon.

Our digital cameras enable you to line up a series of shots, then merge them into one continuous panorama.



The S820D prints directly from most camera memory cards, or directly from PowerShot cameras.²

The art of connectivity.

With Canon, you'll find creating and communicating is a lot easier, and a lot more enjoyable. We believe the most important thing isn't the technology.

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You can...

Canon

When this article appeared in our June issue it contained several errors. By popular request, here's the correct version.

DOUBLE DUTY DVD/MP3 decks

SONY DVP-NS305



<< Details

Contact Sony Australia
Phone [02] 9331 1355
Online www.sony.com.au
Price \$449
Rating ●●●●●

YAMAHA DVD-S520



<< Details

Contact Yamaha Music Australia.
Phone [03] 9693 6111
Online www.yamaha.com
Price \$399
Rating ●●●○○

PHILIPS DVD-729K



<< Details

Contact Philips Australia
Phone [02] 9925 3303
Online www.philips.com.au
Price \$449
Rating ●●●●○

TOSHIBA SD-2650



<< Details

Contact Castel Australia
Phone [03] 9484 3788
Online www.castel.com.au
Price \$499
Rating ●●●●○

SONY DVP-NS305

Crisp high notes and strongly realistic lows don't compromise the quality of the beautiful midranges. Depth of soundstage was impressive and easily outdid the competition.

Full MP3 album and track names and numbers are displayed on-screen — the Sony was the only player on test with this feature. All music is accessible through an easy-to-navigate menu system. If you've compiled your MP3-CD with an organised Genre and Track hierarchy, you shouldn't have any trouble finding and playing the song you want.

PHILIPS DVD-729K

The simple front panel has two microphone jacks for karaoke use. An on-screen display shows which track is currently being played. A handy feature is the simultaneous playback and navigation of the menu of albums and tracks.

The Philips is the only player in the line-up with an audio mute button on the remote control; a handy feature when you need to have some instant silence.

One source of minor annoyance is the LED display, which is smaller than most.

YAMAHA DVD-S520

MP3-CDs play instantly when inserted and a simple onscreen display shows the track and album number playing as well as the amount of tracks. Skip tracks by clicking the left and right navigation buttons on the remote control; albums can be traversed with the up and down buttons.

The front panel gives basic album, track and track time data. This was the only player on test without a drawer open/close button on the controller. The portability is the major attraction.

TOSHIBA SD-2650

The controller is intuitive, but the button labels are not easy to read in low light. As with all these players, when listening to identical material, no obvious compression artefacts were evident.

The on-screen display shows the name and number of the album and track you are playing from an MP3 CD (albeit in an abbreviated form).

For the digital audio purists, music is also fed through the optical port, negating the need for connecting analogue cables for CD playback.



There's one nearly empty. Do you throw them all away?

Many inkjet printers – even some quite expensive ones – combine several different ink colours into one cartridge. When one colour runs out, you have to throw away the whole lot.



Most Canon models use inexpensive separate tanks for each colour. They also have an advanced ink monitoring system that



I can... ...save money
with separate ink tanks.

alerts you on-screen when any of the colours are getting low – so no more running out of ink halfway through a document.

You'll find a new Canon Bubble Jet saves you time, and probably enough money to buy a decent bottle of wine or two.

For more information, call us on 1800 021 167, or visit our website www.canon.com.au

You can...

Canon

Feature



Broadband

The sign says it all. We don't want limits, we don't want excuses, we just want to zoom through the Net as quickly as we can. APC's annual broadband feature is here to help: from finding the right broadband ISP to sharing that speedy connection through your home or office.

74

Slow off the mark

If Australia is the clever country, why are we once again lagging behind the wired world?



78

Broadband buyer's guide

Ditch your dial-up and hit the fast lane with our six-step guide to cable and ADSL.



86

Rev it up!

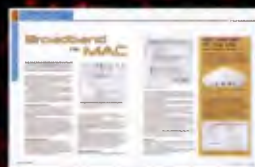
Got broadband? Tweak your PC for an even faster connection!



90

Broadband for Mac

Expert tips to get your Mac connected without the hassle.



102

Network hardware

APC puts network kits and routers to the test.



SLOW off the MARK

Broadband isn't going anywhere in Australia. Uptake is lagging behind the rest of the world and the government and network providers are playing tug of war. Darren Horrigan reports on broadband's current state of play.



In the United States it's called "the mess." In the UK the description "the debacle" has been used. And in Australia you can call it anything you want, except a success. Yet kings, presidents and prime ministers still speak its name in reverent tones. The CEOs of the world's most powerful IT companies — the nervous captains of an industry looking for its Next Big Thing — believe it will be the saviour of our economic times. It's broadband.

Never has so much been promised to so many by something that has delivered so little — so far. The weakness with broadband is that consumers are not buying into its vision the way the industry expected. It remains a luxury purchase rather than a necessity. Even ignoring its extra cost, the installation, reliability and customer support episodes of consumers around the world have been abominable.

Learned voices like Ted Pretty, Telstra's former "Mr Internet" and now group managing director of Telstra Retail, say broadband is withering because the Internet doesn't have enough compelling content to drive consumer demand. Yet multi-million dollar investments in content by Chello, Sportal, Milt Barlow's Tribe, John Peters' k-grind, and Village Roadshow's Scape all lie rotting in Australia's dot-com graveyard.

Some say high-speed access struggles because the big entertainment companies still quiver at how Napster hijacked music. The threat of piracy means they won't digitise their content gems for download until they have ironclad copyright guarantees from law-makers.

Sceptics say the thought of crowding around a computer screen to watch movies and sport is from the same gaga-land that gave us WAP Web sites and 3D glasses. They say consumers are waiting for plans and contracts they can understand, billing procedures they can trust, connections that are secure, increased reliability, lower prices, unlimited downloads, and the one thing broadband is yet to create — a "killer app".

BROADBAND IN AUSTRALIA

Yet there are also those who say there is nothing wrong with broadband. They argue that the current sign-up rate in Australia is comparable to the adoption of new technologies in the past, including the telephone and television. Their message? Everyone needs to calm down, especially the big media and IT companies that continue to gush about the "benefits of broadband," without explaining what they are.

This, says Phil Sykes, is the core of the issue. As the former Telstra

executive who headed the rollout of cable in Australia in 1997 — the man who launched our fast-access journey — Sykes says broadband is a story that remains untold.

"Broadband in Australia has been the most squandered opportunity that the country has had in the past decade," says Sykes, now the CEO of business broadband provider, Request DSL.

"It has been around, robust and ready, in Australia on a large scale for five years, yet most Australians still don't know about its benefits. It's been kept almost a secret, which is very sad. People don't use broadband today because they don't know what it does."

Sykes says having multiple PCs with simultaneous fast access that is always on, plus a free phone line, is broadband's big attraction. "A second phone line rental costs \$20 a month," he says. "If you then pay for even bare bones dial-up Internet at \$24 per month you're up to \$44. If you make \$20 worth of calls you're up to \$64 a month — for narrowband."

"If that financial equation was articulated well to residential customers, they'd realise they can get broadband and a free phone line for what they have to pay for narrowband and an extra line. Have you ever heard anyone articulate the benefits of broadband in that way?"

THE BROADBANDOCRACY

Australia now has a national broadband advisory group and there is no shortage of energetic watchdogs monitoring our broadband environment. The Australian Competition and Consumer Commission, the National Office for the Information Economy, the Australian Consumers' Association, the Australian Telecommunications Users' Group, various broadband interest groups and a gaggle of analysts all say Australia ranks poorly against most developed countries for broadband performance.

The Shadow Minister for Information Technology, Senator Kate Lundy, says that by placing Telstra's profitability at the forefront of all government policy considerations, the Federal Government and Telstra have ensured a consumer access network that belongs in the last century — to the detriment of Australia's growth and potential.

But the men sitting at the controls of our broadband infrastructure, IT minister Senator Richard Alston and Telstra CEO Dr Ziggy Switkowski, won't hear a word of it.

Few will forget Alston's opening address at the recent ATUG 2002

Comparative broadband usage: WORLDWIDE

The National Office for the Information Economy (NOIE) says Australia lags behind other developed nations for broadband adoption in the home. Its latest figures (as of September 2001) reveal that about 5% of Australians accessing the Internet at home did so at high speeds (DSL, Cable, LAN, etc), placing Australia equal 9th (with Norway and New Zealand) of the 14 countries benchmarked. South Korea was the leading adopter of broadband access with 87%, followed by Hong Kong (52%), Taiwan (38%), Singapore (25%), the US (19%), France (13%), Sweden (12%), and Germany (8%). Australia was ahead of Italy (4%) and the UK (4%).

conference where he described as "baying dogs" those people concerned about Australia's slow adoption of broadband. "The key measure is the availability of the service rather than adoption rates," he said.

"Australia is well placed to take up broadband, given the infrastructure already in place and our propensity to take up new technologies. Consumers are waiting for compelling content to give them the incentive to switch to broadband."

Lundy gags on this assumption. She says both the government and Telstra have played a role in Australia's steady demise to 13th place in the OECD rankings of per capita broadband connections.

However, Switkowski denies that Telstra or the government have hindered the uptake of broadband. "I wouldn't for a moment accept that we are lagging behind OECD countries," Switkowski told the IT World Congress in Adelaide.

"We will close that gap very quickly as we get these models sorted out and as Australians are persuaded by the appeal of broadband."

Telstra has since announced a \$50 million program to promote broadband in Australia. It includes grants of up to \$250,000 to local organisations or developers who create tools that encourage broadband adoption, and a \$5 million advertising campaign.

Switkowski says these measures will result in more than one million people having a broadband connection by 2005. To achieve that, our broadband providers would need to sign more than 28,000 new customers every month, starting now. This just as Telstra's ADSL and cable sign-ups combined have slumped to 13,000.

Lundy and leading Australian broadband user group Whirlpool believe Telstra's corporate decision-making and the government's "policy ignorance" have cost Australia dearly and that someone should be made to answer for it.

WHAT'S ON OFFER

Today, Australia has 102 providers of high-speed Internet access. Metropolitan consumers are confronted with a confusing kaleidoscope of cable and ADSL plans. Regional and rural Australians face a very different problem — just ask George Bray.

Bray quit his job as CEO of LinkAlarm to become the "ambassador" to the Internet Industry Association's Digital Bridge Task Force. He has just completed a six-month, 10,000km national fact-finding tour of Australia.

Bray says volume limitations, download charges and lack of choice are choking the uptake of broadband in the bush. "If you subscribe to a broadband service you get your download allocation, then you get charged for the extra," says Bray.

"The big problem is that people don't know how much it costs to download something like a movie trailer or to make an Internet telephone call. I still don't know myself and I've been at it for ages.

"These things are scaring people away from getting involved in broadband. I've used four different broadband services and I won't watch certain things because I have no idea what sort of bill I'll get at the end of the month."

Some providers are trying. In February this year, Optus and Adelaide-based Apertura launched broadband services to rural communities that, says Optus, will "challenge the status quo for broadband delivery."

A satellite receiver is installed in a community as a "gateway" for a wireless Internet service to individual users, delivering video-conferencing, interactive multimedia, virtual private networks (VPNs) and fast Internet access.

Chris Hancock, managing director for Optus Business, says the company plans to establish gateways around the country. "We can install one dish per group, offering broadband services to entire



communities and allaying the cost significantly," he says.

"By networking a group or a community of users, this alliance offers flexible and affordable broadband to groups that are otherwise not well serviced."

HOW IT COULD WORK

A working example is the private network installed for the Tatachilla Lutheran College in McLaren Vale, South Australia. The school offers free broadband to students and teachers and on-sells access to parents and others in the district.

Compare this to new housing developments in the US, Singapore and Scandinavia, where broadband comes automatically installed. This idea is catching on in Australia — some property ads in Melbourne and Sydney now wax lyrical about the release of new inner-city apartments with “resort-style facilities including an indoor lap pool, gymnasium and high-speed access”. Soon, even real estate agents will be pushing the benefits of broadband. Or perhaps it will be the power company.

Power Line Communications (PLC) is a technology that uses electricity cables to carry voice and data communications. Power companies in Europe and North America are currently running trials and a commercial service at 4.5Mbps (40 times faster than ISDN) is already available in Germany.

The major advantage of PLC is that it overcomes the “last-mile” problem of access provision, dispensing with the ugly, disruptive and costly excavation involved in laying new cables. Energy Australia is testing PLC in NSW and Tasmania.

Then there is CityNet International, an American company with ambitious plans to wire cities for fast Net access by running fibre optic cables through sewers. Engineers say this is the perfect option because sewage tunnels are strong, deeply laid and, most importantly, they exist everywhere already.

CityNet’s approach also uses a robot called a Sewer Access Module (SAM) to lay the cable. SAM has already started to wire the sewers of Dallas, Houston, Indianapolis, Pittsburgh, Albuquerque, Seville and Vienna, with each civic authority being guaranteed an annual return of 2.5% of CityNet’s gross revenue from that city. This explains why CityNet has attracted interest from cities around the US, Europe and the UK. It’s also the main reason broadband success is regarded as so important — money.

According to Japanese newspaper reports, McDonald’s may be offering broadband Internet access at 4,000 of its restaurants in Japan by year’s end. With Internet investor Softbank as its partner, the fast-food company is testing high-speed Internet services via a wireless LAN network. It will allow people to use a laptop or any other Internet-enabled device to send and receive data at broadband speed. The service is designed to attract more customers for McDonald’s and give Softbank’s broadband business a boost.

Higher-speed connections in the home and workplace will also create demand for more computers, faster chips, and new forms of networking



Comparative world prices: MONTHLY ACCESS

Korea	\$32.50
France	\$53.15
Germany	\$64.69
UK	\$67.61
US	\$68.32
Australia	\$89.00

Source: The Office of Telecommunications (Ofcom) — the regulator for the UK telecommunications industry. Prices quoted (in Australian dollars) are the lowest rate for residential access for a 512Kbit/s /128Kbit/s or equivalent service.

equipment and software, all generating sales throughout the technology food chain.

Charles Britton, IT and communications policy expert at the Australian Consumers’ Association, says: “Government, the bruised IT industry, media and content companies are all surveying the tech wreckage and wondering: what next? Among some of the faithful, the hope is that a new technology will emerge to blow them out of the financial doldrums. But it is imperative to balance technology fascination with a little consumer realism.”

Independent IT and telecommunications analyst Paul Budde says that of the estimated \$90 billion the Australian telecommunications market will be worth by 2010, broadband will account for \$81 billion.

In a study published last year by the US-based Brookings Institute, economist Robert Crandall said broadband could be worth as much as US\$300 billion a year to the US economy alone.

Such an estimate prompted John Chambers, president and CEO of Cisco Systems, to challenge the US Government to adopt a broadband policy akin to JFK’s commitment to putting a man on the moon in the 1960s.

Canberra is also feeling the capitalists’ blowtorch. Sanjay Kumar, the CEO of Computer Associates, wants the government to consider financial incentives to promote broadband. Microsoft Australia wants broadband infrastructure access widened to Telstra’s competitors.

Microsoft’s chief technology officer, Craig Mundie, believes Australians must be encouraged to take up high-speed access. It was the same warning Mundie’s boss delivered to Telstra when he was in Australia two years ago.

However, warnings seemingly aren’t enough. There needs to be a clearly outlined, intrinsic value attached to broadband. Telstra and its reseller partners are gearing up for a massive marketing campaign to communicate the benefits of broadband to business. This goes part of the way in addressing confusion about broadband costs. But the government must also work with infrastructure providers and the IT industry to create a broadband policy that addresses the needs of the nation rather than the profitability of Telstra. Until this happens, broadband will remain largely irrelevant to consumers and businesses here in Australia.

Unless broadband takes off soon, Australian businesses stand to lose competitive advantage, consumers will miss emerging entertainment opportunities and the IT industry will struggle to claw its way out of the doldrums and contribute to sustainable economic development. ■

Broadband BUYER'S

Want broadband but don't know where to begin? Fiona Angus gives you the lowdown on what you need to know before signing up with a high-speed provider.

You want broadband because it's fast, it's always on and it frees up your phone line. You don't have it because it's either hard to get, expensive, unreliable or all three. If you live in one of the exclusive 2.7 million homes with access to either Telstra or Optus' separate hybrid fibre coaxial (HFC) cable networks, getting a reliable high-speed connection is easy. For everyone else, there's Telstra's Asymmetric Digital Subscriber Line (ADSL) network. It uses excess capacity on your existing phone line (which you rent from Telstra) for high-speed data transfer.

Suddenly, 70% of the population can get permanent high-speed Net access simply by asking their local Telstra exchange to hook up their phone line to a Digital Subscriber Line Access Multiplexer (DSLAM) and then onto the IP backbone.

BETTER BY A MILE

Deena Shiff, the chief of commercial operations for Telstra Wholesale, recently explained to a bemused broadband industry forum that 95% of Australian Net users choose dialup because they're comfortable with the technology and see no reason to change.

APC asked her whether the lukewarm response to broadband was actually because the 150,000 people who currently use it have suffered disappointing and unreliable performance. "No," she said. "The service has had issues. It is improving and we now have product that is at the point of maturity."

The number of people asking Telstra to switch their phone line to ADSL has been growing steadily since the service was first offered in August 2000. In April this year APC readers, such as Lee Barbazon of Darwin and Tim Keown of Sydney, reported widespread outages and speed gluts.

The network wasn't coping with an influx of new users. A mini broadband boom began a few months before, when the ACCC forced Telstra to lower its wholesale ADSL prices so other providers could offer services over the "last mile" of copper wire from the telephone exchanges into homes. Barbazon and Keown both disconnected their Telstra broadband accounts — more competition was pointless if the network wasn't reliable.



Telstra has since installed new hardware and upgraded software, a spokesperson said. "The network is behaving itself very well." And users confirm it. Barbazon raves about his new broadband provider, Netspace. "I've had one outage and that was solved quickly."

Keown has moved to Always Online. "Since the initial set up phase, it's all been really sweet. I've not had any further drop-outs or slow times. It's noticeably faster than Telstra, often clocking the promised 1500Kbit/s." The price is about the same, but customer service is almost immediate and staff are pleasant to deal with.

Just because every provider uses Telstra's "last mile," doesn't make all broadband the same. Some providers manage their service better than others. "In simple terms, what we buy [from Telstra] is connectivity to the network," says Pacific Internet managing director Dennis Muscat.

"As a service provider we add the bandwidth. We ensure that the pipes we've got that connect to Telstra's network are wide enough so that we have good speed and throughput." Once you leave Telstra's "last mile," Pacific manage at least some of your data on parts of their own intercity backbone, compared to other providers who keep you within Telstra's wider network.

GUIDE

"All our competitors connect to the same system, so when there is a fundamental network issue, everyone goes down." Pacific also offers business-grade broadband by combining Telstra's and NEC's NEXTEP network. "We guarantee that they'll always be up and congestion will be controlled."

So when can we expect that level of service? "That's a damned good question," he says before pausing. "With a mass market product, the standard and quality is always going to be difficult to achieve compared to a premium business service. The current Telstra products will not give us that guarantee of uptime and also throughput at this stage."

"And if it's not offered to us from the network provider, it's very difficult for us to offer it to anyone else." Telstra gives limited rebates to providers like Pacific, if their network goes down for more than six hours in a month. So how do you know which providers are offering a decent service and which aren't?

WELCOME TO THE WHIRLPOOL

"You don't," says Simon Wright, the editor and founder of Whirlpool.net.au. The site is a resource for all things broadband, with technical information, the latest plans and a news section. But it's Whirlpool's 11,000 card-carrying members that can give you the information that will help you choose the provider that's best for you.

A few organisations (including APC) have tested the performance of broadband providers in the past. Yet analysing data doesn't really tell you what kind of connection you're going to get. So much depends on your physical location and the condition of the network, as well as what you're downloading.

Even the author of Australia's most comprehensive broadband performance tests, ACNeilsen's Richard Gillis, advises you to research and choose your provider based on your individual circumstances (see Satisfaction and Performance).

"The only real, reasonable way to determine if an ISP is any good is to discover other people's experiences. Get a recommendation," Wright says.

Feedback to Whirlpool can make-or-break a new provider (they all watch it like hawks). Even Telstra, notoriously closed about network issues, contacted Wright about a story in Whirlpool's news section (if only to deny it). Internode established its credentials early when chief executive Simon Hackett chose an honest and open approach to customers after many Whirlpool members became fed up by Telstra's "scripted" helpdesk support.

Hackett participates in the forums under the unassuming profile

SIX STEP Broadband Plan STEP 1

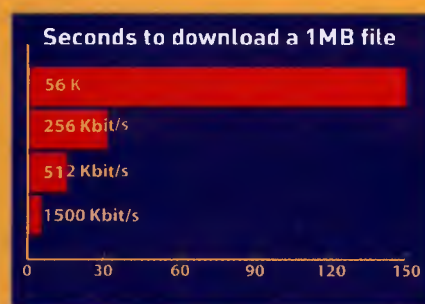
What can I get? Find out if your neighbourhood is wired for OptusNet Cable (www.optushome.com.au/availability.html) or Telstra BigPond Cable (www.bigpond.com/broadband/cable/CableSQ.asp). Most APC readers will find ADSL is their best (and only) option. Check if your local exchange is ready for ADSL and your home is within the required 5km radius (www.telstra.com.au/adsl/ordering/search.cfm).

If you're ever told (by any provider) that you can't get ADSL, ring Telstra and find out the precise technical reason. Then Telstra "tests" your phone line to see whether it can handle top speeds of 1500/256Kbit/s. If it can't, your application is rejected. However, it's theoretically possible to get a "slower" 256/64Kbit/s connection up to 7km away. This could give another 10% of the population access to broadband, so there's pressure on Telstra to change its "1500Kbit/s or nothing" policy.

A few tiny independent broadband networks exist in Canberra, regional Victoria and Western Australia. Satellite providers should be your last call if you can't get ADSL or cable, but be careful of exorbitant installation fees.

STEP 2

How fast? Broadband plans come in three basic download/upload Kbit/s ratios: 256/64Kbit/s, 512/128Kbit/s and 1500/256Kbit/s.



Should you automatically choose the fastest? You can always change your speed or download plan, but even at 1500/256Kbit/s, you can't expect the maximum advertised speed all the time. For surfing the Web, there's often very little difference between a "high" and "low" speed connection. Sometimes Web pages will download in a flash because they are designed for dialup users. Other sites will drag because of the unpredictable nature of Internet routing. Speed really matters if you want ultra-fast direct downloading, high-quality streaming and sustained data transfer rates.

Cable vs ADSL. Is ADSL faster than cable? The truth is that cable and ADSL users both report similar experiences. Network speed is determined by how much bandwidth your provider allocates, how efficiently they manage traffic and what you're trying to download. Just because cable is "shared" among a neighbourhood and ADSL offers a direct line doesn't make ADSL faster. OptusNet Cable and Telstra BigPond Cable both advertise an "uncapped" download speed. This just means they'll allow you to download as fast as the network will permit, because speed is determined by how well the network is managed.

STEP 3

Know your limits. Most plans come with a monthly download allowance. Use APC's download calculator and see how the top rated plans compare on a price/MB graph (www.apcmag.com/apc/apcmag.nsf/1_pages/calculator). A 3GB monthly allowance covers most users, but look out for off-peak rates or consider a more expensive pay-as-you-go option. An honest look at your Internet activities will save you from locking yourself into a 12 month contract that doesn't match your downloading patterns. Some readers aren't interested in beefy files, but can't live without the ongoing email notification and one-touch access to their work databases. To avoid excess charges, monitor your usage with software from your provider or one of the programs on this month's CD.

Tip: Does the download allowance include all data transferred? Plans with "free uploads" can add 10-30% more data to your monthly allowance. Every time you send a request for a Web page, you upload a small amount of data. It's also great if you FTP or host a Web site.

STEP 4

Plan your home hardware. No broadband installation is the same. You need to map out your home and your hardware. Only Telstra-certified equipment can be used on the network, (go to www.telstra.com.au/adsl/equipmnt.htm), including modems, splitters and filters. "Each individual house has different requirements," says D-Link's Graeme Reardon. "In my house, I have three phone extensions coming off my phone line. I have to utilise one of those extensions for my ADSL modem and the other two would need a micro-filter. I also want to keep the phone handset next to my PC, so I'd buy a splitter for that."

Telstra only supply D-Link and Alcatel modems, but don't just take any old modem that comes with a plan. A plug-and-play USB modem is cheaper and easier, but it means you can only use your broadband connection on a single PC. An Ethernet modem lets you share your connection — you can put your old Pentium II to work as a network router, buy a more secure dedicated hub, or go all out with Wireless gateway and print server. Dick Smith Powerhouse and Harvey Norman offer broadband-in-a-box packages. Dick Smith Powerhouse Chatswood Store Manager Katrina Cowling is preparing to set up a wireless ADSL versus dialup demo. "It really lets people get hands on."

STEP 5

Who will support you? If you're running anything other than Windows 98 or above, some providers don't want to know you. Support services are usually confined to the single PC connected to your modem. Linux, Mac and networking fans can sign up, but providers either won't support you or installation will require an expensive on-site visit.

"broadband enthusiast", discussing anything from network problems to proposed pricing changes. "Whirlpool is a way to get customer feedback," he says. "I know if my customers are happy or not. I know because they've told me so and I've debated the issues with them."

Internode's broadband subscribers now number more than the dialup subscriber base. Wright calls it the "Hackett factor". One Whirlpool member comments: "This has got to be a first, an ISP explaining (potential) performance issues *before* people start complaining... what's the world coming to?"

Hackett has advice for operators using the site. "Whirlpool is great if you are what you seem. You have to be honest." Wright is also cautious: "It is a public forum and you sometimes end up with your dirty laundry aired. Sometimes people try to embarrass you into action."

Most members understand they should try to solve technical or service issues with their provider first, and people with unfair expectations can get their knuckles rapped by other members in the brutal language of a public forum.

KNOWING YOUR LIMITS

Whirlpool will give you a clear picture of what a high-speed Net connection can and can't do. "Broadband isn't going to change your life," Wright says. "What you're really buying is a really fast, premium Internet service." A 300MB BigPond dialup account costs \$28.95 per month. If you dial in 4 times a day, then you're paying \$53.43 per month. "It's reasonable value to connect to the Web."

Wright continues. "The first thing you'll notice when you get broadband is you immediately start to use more data. If a Web page previously took 10 seconds to load and now takes two, then you can do more with that extra time. You start to use the Net when you otherwise wouldn't. I like to be able to check my email when it comes in or search Google when I'm writing something."

Telstra introduced download limits last year, which have become the de facto industry benchmarks. Subscribers say the measly monthly stipend defeats the purpose of broadband, but providers argue a user-pays system preserves precious bandwidth from abuse. Wright connected to Telstra BigPond Cable in 1997. "My 3GB monthly limit is enough for what I need, but only because the Web sites I use are tailored to dialup."

"You can't do things that need a lot of data because you have these download limits. When you start streaming even existing stuff from BBC or movie trailers, you find you hit these limits. A broadband connection isn't like a mobile phone where it's really easy to tell how much you're going to be charged. Consumers can't easily translate their GB usage to their Internet activity and what that will add up to each month."

He says bluntly that broadband isn't worth it for everyone, "but I think it's a really good thing to have."

*All figures courtesy ACNielsen.Consult

SATISFACTION AND PERFORMANCE

Richard Gillis, senior analyst at ACNielsen.Consult and author of the Residential Broadband User Satisfaction tracking study and The ISP Probe Report, describes the real experience of broadband so far.

"In March and April 2002, ACNielsen.Consult surveyed 45,064 Internet users and asked them how satisfied they were with their ISP's overall performance. Remember, this is users' perception of performance and, as such, what may be satisfactory for one is dissatisfactory for another.

Firstly, let's look at the dialup versus broadband markets in aggregate. In April 2002, 81% of dialup and 75% of broadband users were satisfied with their ISP. Thus, on an aggregate view you could surmise a lot of things, such as: broadband is not all it is cracked up to be; broadband users have higher expectations of their service provider; broadband service providers are not delivering; etc. However, once you look past the aggregate view you notice that oils ain't oils when it comes to individual ISPs.

It turns out that broadband users are split into two camps — the very satisfied and the not so satisfied. OptusNet Cable has the highest satisfaction of any service provider in Australia (whether dialup or broadband), with almost all (93%) customers satisfied with the overall service they receive. On the other hand, Telstra Big Pond Cable and ADSL only rated 63% and 62% respectively.

After such a confusing case of customer satisfaction I can hear you all ask: 'well which ISP would I recommend?' With all the various providers introducing new services, all at differing speeds, prices, download limits, on and off-peak usage, static versus dynamic IP addresses, consumers have become confused. I'm confused and we have more quantitative data than anybody could possibly imagine. But this does not help the individual to make a purchasing decision.

Over the six years we have conducted the survey, the importance of a friend's/colleague's/ magazine's/Web site's recommendation has steadily increased in how individuals select their ISP. Approximately 11% of individuals' primary ISP selection criteria are recommendations, compared to 13% who base their decision on price. So recommendations are important and becoming more important.

That is why I refer people to Whirlpool; a group of real people having real conversations about real products. It is open, honest, direct, and often inflammatory. But that is what makes it great. It is the market recommending, not the marketers. Let's face it; all service providers have their individual strengths and weaknesses. We recommend utilising the Whirlpool and Broadband Choice (www.broadbandchoice.com.au) sites before selecting a broadband service provider."

BROADBAND LINKS

TCP/IQ

www.tcpiq.com/tcpiq/linespeed

Compare detailed performance graphs and real-world speed measurements logged by users on every major Australian and International high-speed ISP. Measure your own line speed and submit the results so others can identify the best-and-worst performing providers.



CABLE-MODEMS.ORG

www.cable-modems.org

Your broadband modem reference guide and toolset. Should you go with USB, Ethernet, 4-port, 8-port, or perhaps a router, a hub or something wireless?

TELECOMMUNICATIONS INDUSTRY OMBUDSMAN

www.tio.com.au

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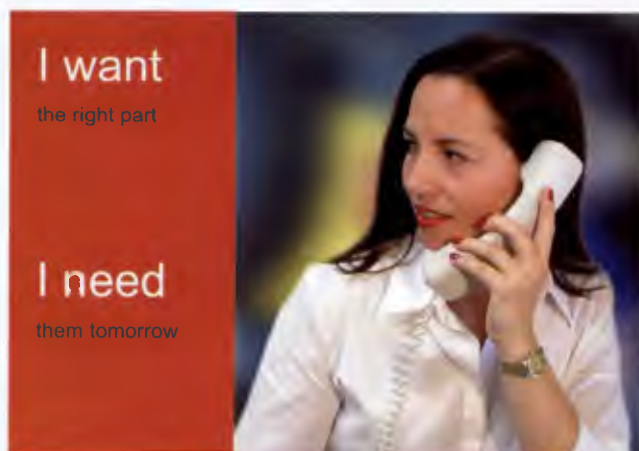


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For the best all-round broadband service in Australia. Their plans have generous downloads, with good support and performance. Unfortunately, the network only reaches a small proportion of homes in Sydney, Melbourne and Brisbane.



For great value and flexible plans, especially for high-volume users.

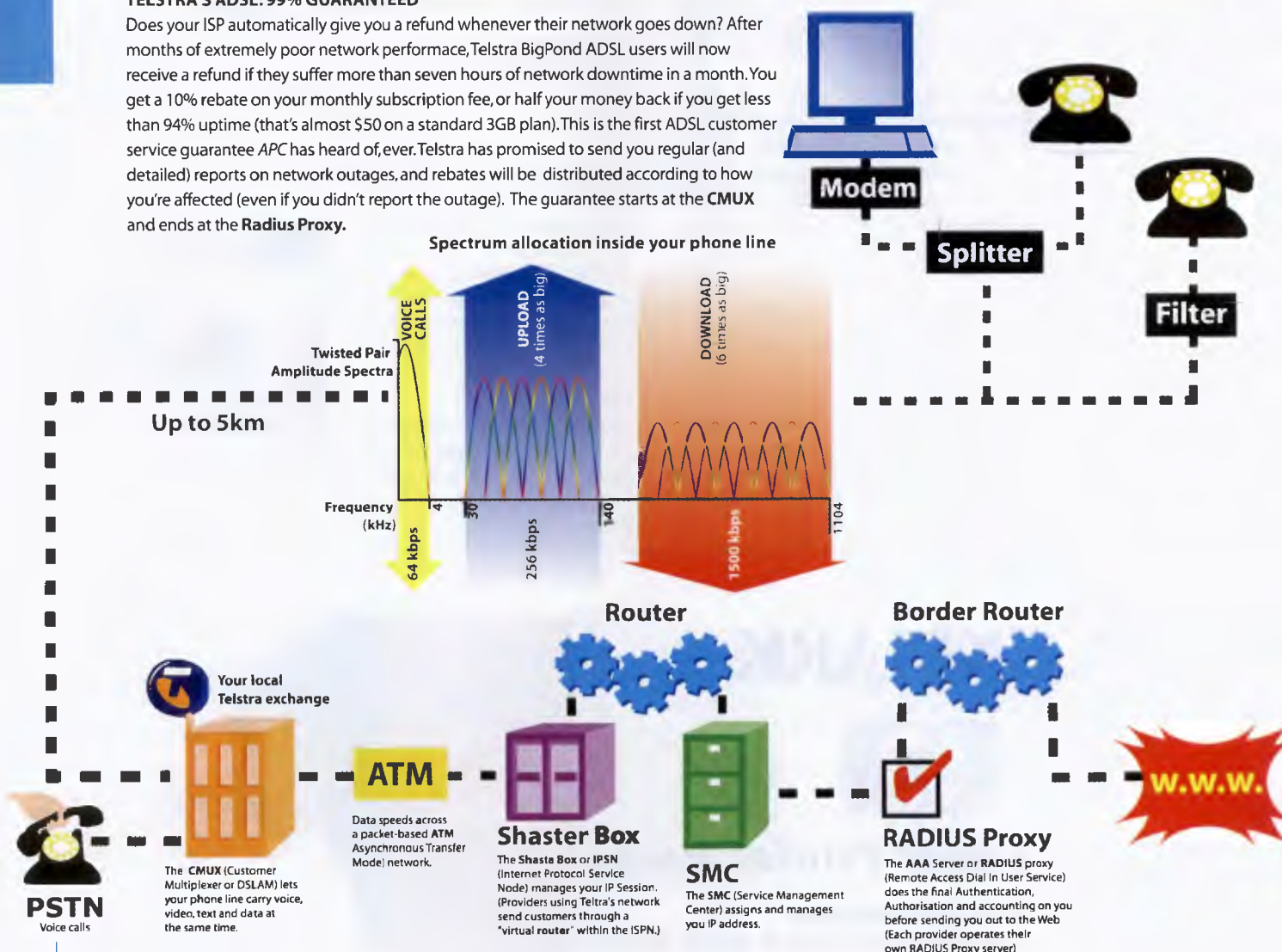


(Cable and ADSL) For having the largest network, widest coverage and largest subscriber base in Australia. They offer acceptable deals and a large range of plans. The cable service offers slightly better value for money but only reaches some homes in Sydney, Melbourne, Brisbane, Adelaide and Perth.

www.whirlpool.net.au is the heart of the Australian broadband community. Over 11,000 members discuss and rate different ISPs, and keep each other up-to-date on changes in service levels and performance. Whirlpool is run by volunteers and enthusiasts and completely independent. Find news, discussions, rumours, plans and prices, troubleshooting guides and accurate information about Australia's complex broadband networks. Ask for individual help from existing members in the forums or find links to local Web sites anything from home networking, ping tests, Mac and Linux support and gaming.

TELSTRA'S ADSL: 99% GUARANTEED

Does your ISP automatically give you a refund whenever their network goes down? After months of extremely poor network performance, Telstra BigPond ADSL users will now receive a refund if they suffer more than seven hours of network downtime in a month. You get a 10% rebate on your monthly subscription fee, or half your money back if you get less than 94% uptime (that's almost \$50 on a standard 3GB plan). This is the first ADSL customer service guarantee APC has heard of, ever. Telstra has promised to send you regular (and detailed) reports on network outages, and rebates will be distributed according to how you're affected (even if you didn't report the outage). The guarantee starts at the **CMUX** and ends at the **Radius Proxy**.



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SMART-BURN SMART-X



40x12x48x

STEP 6

Shop around. Readers consistently tell us that it's worth paying a little extra for a friendly provider with a well-resourced helpdesk. APC encountered one provider that was less than up-front about its hidden charges. Once you sign the contract, it takes around ten days for your phone line to be connected. If you want to change providers, your line will be disconnected at the exchange and you'll have to wait in the queue to get reconnected. The wrong decision will cost you time and money - there's also a reconnection fee if you move house, and if broadband isn't available in your new home, you're slugged with the entire cancellation fee under the terms of your contract. Here's a selection of the entry level plans from the main broadband providers.

Provider	Contact	Modem plan	Price	Sign-up fee	Speed download/upload Kbit/s	Monthly allowance	Free uploads	Extras	Network coverage
Apple Broadband	www.applecomm.net 1300 66 67 66	Plan F [with preselection]	\$40	\$89	256/64	300MB	No	ADSL USB modem and line Filter/Splitter	National
Connexus	www.connexus.net.au 1300 133 888	Lifestyle 256	\$49.95	\$139	256/64	300MB Peak 1700MB Off-Peak	No	5 mailboxes and 10MB Web space	National (ex WA, NT, Tas)
Datafast	www.datafast.net.au 1800 330 115	Broadband Bronze	\$49	\$125	256/64	1GB Peak 1GB Off-Peak	No	Five email accounts, 10MB Web space and free access to Datafast games and entertainment servers	NSW, Vic, Qld
Flow Communications	www.flow.com.au	FlowDSL Lite	\$19.95 [18.5c per MB up to 500MB and 12 cents thereafter]	\$99	256/64	None	Yes	No extras	National (ex WA)
Internode	www.adsl.internode.on.net 1800 685 999	PADSL-256-Red	\$49.95	\$139	256/64	300MB	Yes	Five mailboxes and 15MB Web space	National (ex WA, Tas)
iPrimus	www.iprimus.com.au/ broadband.asp 1800 850 000	HomeJet 256 Lite	\$45	\$169	256/64	500MB	Yes (if upload to download ratio is less than 2:1)	Five mailboxes and ADSL USB modem rental	Capital cities
Netspace	www.netspace.net.au/ products/adsl/home 1300 360 025	Home Broadband 256	\$69.95	\$388	256/64	1GB peak, 2GB Off-peak	No	One mailbox, 10MB Web space, USB modem, access to Netspace gaming and chat servers	National
Pacific Internet	www.pacific.net.au/ homedsl 13 36 35	Basic "Build your own Plan"	\$59.95	\$219	256/64	500MB	Yes	Unlimited uploads and access to Pacific Internet's mirror, gaming, news and chat servers	National
Telstra BigPond ADSL	www.bigpond.com/ broadband/adsl 131 282	300MB Residential [with preselection]	\$59.95	\$259	256/64	300MB	No	4-port modem and access to Telstra's news and entertainment servers	National
TPG	www.tpg.com.au 1300 360 855	Broadband 512v	\$51.95 (\$26.95 access fee plus 15.9c per MB up to 300MB and 5c thereafter or a minimum \$25 usage charge)	\$99	512/128	None	No	20 mailboxes and 10MB Web space	National
OptusNet Cable	www.optus.net.au	Lite 550MB [with telephony package]	\$54.95	\$229	Uncapped/128	550MB	Yes	Five email accounts, 10MB Web space and access to Optus news and entertainment servers	Sydney, Melbourne and Brisbane
Telstra BigPond Cable	www.bigpond.com/ broadband/cable/ products.asp 131 282	300MB Residential	\$54.95	\$259	Uncapped/128	300MB	No	10MB free Web space, cable modem	Sydney, Melbourne, Brisbane, Adelaide and Perth
OptusNet Cable	www.optus.net.au	Lite 550MB [with telephony package]	\$54.95	\$229	Uncapped/128	550MB	Yes	Five email accounts, 10MB Web space and access to Optus news and entertainment servers	Sydney, Melbourne and Brisbane
Telstra BigPond Cable	www.bigpond.com/ broadband/cable/ products.asp 131 282	300MB Residential	\$54.95	\$259	Uncapped/128	300MB	No	10MB free Web space, cable modem	Sydney, Melbourne, Brisbane, Adelaide and Perth

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REV it UP

The only time slow and steady wins the race is in fairytales. In the Internet age, it's a different story altogether.

Serdar Yegulalp shows you how to fine-tune your broadband connection.

"I feel the need, the need for speed," quipped Tom Cruise's character Maverick in the movie *Top Gun*. Don't we all? With ADSL joining cable and satellite as a maturing high speed Internet option, broadband is available to more Australians than ever before.

And once you've got the bandwidth, it's only natural to want to make the most of it. Granted, once you get your broadband connection you'll be cantering along at a decent clip, but there's a lot more you can get out of your connection with a little work.

One thing this article does contain is practical suggestions for getting the most out of the bandwidth you have available.

EDIT YOUR TCP RECEIVE WINDOW SIZE

There's been a great deal of smoke blown about which registry settings you can edit to speed up your network connection. Some work, but some just make things worse or do nothing at all.

One of the few that does something worthwhile is the TCP Receive Window Size. This setting governs how much data is

received by your PC in one go before it sends back an acknowledgment (known as an "ACK packet").

The larger the window, the more data can be sent in a single burst and the fewer ACK packets need to be sent back. On a broadband connection, you can boost this setting really high for openers. I set mine to 64,240 (bytes), and tried ramping it down from there, but 64,240 brought the best overall results for me.

To change the setting in Windows 2000 and XP, fire up REGEDT32 and go to HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\Tcpip\Parameters, and add (or edit, if it exists) the DWORD value GlobalMaxTcpWindowSize. Set it to 64512 decimal and reboot. In 9x, the exact location of the key is KEY_LOCAL_MACHINE\System\CurrentControlSet\Services\Class\NetTrans\000x\MaxMTU.

EDIT YOUR MTU

Another TCP/IP setting which is widely claimed to have an effect on network speeds is the MTU, or Maximum Transmission Unit. This describes, in bytes, the largest possible size for a TCP packet. The default MTU size is 1,500 bytes

for Ethernet (LANs), but the default MTU size on the Internet is 576 bytes.

Most of the people I have talked to and most of the experiments I have conducted have shown no real change from playing with the MTU. I set mine to 1500 and left it at that; setting it to anything else doesn't seem to change anything at all.

If you want to change the MTU in Win9x, it's in the Registry as a DWORD value named MaxMTU under the key HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\Class\NetTrans\000n (where 000n is your TCP/IP protocol, this may vary from machine to machine). In Win2K/XP, the value is MTU and it's in HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\<Adapter Name>\Parameters\Tcpip (where <Adapter Name> is the name of your network adaptor).

EDIT MAXCONNECTIONSPERSERVER

This one's really sneaky. The HTTP 1.1 specification only allows a client to open two connections at once to a Web server. By ramping this up, you can open more connections to the same server and perhaps use more of the bandwidth at your disposal.

However, this setting may not be respected by all Web servers — some aren't programmed to allow more than one connection to be open at a time. If you want to change it, in Win9x you can find the DWORD MaxConnectionsPerServer at HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Internet Settings\In W2K/XP, it's at HKEY_USERS\DEFAULT\Software\Microsoft\Windows\CurrentVersion\Internet Settings.

Set the MaxConnectionsPerServer value to anywhere between 4 or 64. I have it set at 64 for the best possible results.

DISABLE NETBIOS (IF POSSIBLE)

TCP/IP is used to carry a number of different services in addition to regular IP traffic. The fewer services you have running over TCP/IP, the more room there is for actual net traffic.

One such service is NetBIOS. NetBIOS is used on all versions of TCP/IP as an adjunct to Microsoft Networking for Windows. It's used to glean information about the local network for browsing, so if you only have one machine you can turn it off and lose almost nothing.

To disable it in 2K/XP, right-click on the active

network connection, select Properties; then the TCP/IP Protocol, click Properties, click Advanced, select the WINS tab, then "Disable NetBIOS over TCP/IP." In Win9x, NetBIOS cannot be easily disabled since the stack is less flexible.

The QoS Packet Scheduler (QoS meaning Quality of Service) works with TCP/IP to guarantee that certain network services get priority. On a regular desktop computer this isn't nearly as important, so you can turn it off. It's enabled by default in Windows 2000 and WinXP.

There is one downside to disabling NetBIOS — if you have an in-house workgroup, you won't be able to browse for other computers. You'll still be able to access them through a UNC address (such as \\server\folder), but you won't be able to see them in the Network Neighbourhood.

Another point: your printers may also not be visible if you're sharing one out with File and Printer Sharing.

USE 100MBIT CARDS

This is especially important if you're sharing a Net connection through a hub or an in-house connection-sharing server.

If you created an in-house network a few years ago, you probably have a 10Mbit network. Most network cards today, and most network media, can support 100TX connectivity, which allows up to 200Mbit/s (100 upstream, 100 downstream, simultaneous) speed.

By contrast, most network cards and LANs use 10Mbit single-duplex (transmit or receive only at any given time), which is anywhere from 1/100th to 1/200th the speed of 100TX. The in-house network will be ferrying not only your Net traffic but everyone else's, so the more you can get out of it, the better.

To that end, you'll need to upgrade the hub or switch (switches are generally more efficient for this type of job) to a 100Mbit model and set your network cards to support 100Mbit full-duplex connections. The exact way to do this varies between network cards, so you'll need to check with the manufacturer.

If you don't have an in-house network yet — but you're itching to set one up — you can buy kits that come with two cards, cabling and a 10/100 hub or switch for around \$200. Note that the cables need to be CAT5 (Category 5) to support 100TX, but most cables sold today conform to this requirement.

Note also that hubs and switches are not the

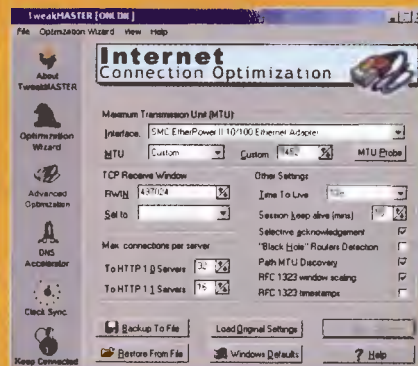
USING SOFTWARE to tweak your connection

There are dozens of programs out there that claim the ability to tweak your connection to get the fastest possible network throughput.

Most of them, while not being completely worthless, are nowhere nearly useful enough to justify the effort of installation — they either miss critical features, are typically packed full of irrelevant or useless controls, or do more harm than good.

The best of the bunch that I've seen so far is TweakMASTER (www.tweakmaster.com), now in revision 1.61. This program doesn't do absolutely everything, but sticks to performing two important functions: it makes changes that do make a difference and the features it adds are genuinely useful. Depending on what kind of network you have, it'll optimise your settings through a hands-off wizard-style interface — or you can get down 'n dirty and tweak the settings yourself.

It also caches your most commonly-used DNS entries, which saves time when browsing. It does this by adding entries directly to your HOSTS file and dumps out entries every so often (or on demand). Best of all, you can always undo your changes if you wind up making things worse.



TweakMASTER stands out as a useful tool for fine-tuning your broadband Internet connection.

Feature

the same thing. Hubs simply blindly repeat everything that gets sent to all its ports, whereas switches intelligently direct traffic. A 100Mbit network is best with a switch, not a hub.

USE A GENUINE NETWORK CARD

Some cable modems connect to the PC via the USB port, rather than the more conventional network cable. Usually this is done to spare the expense of having to furnish a network card (since that adds anywhere from \$20-40 to each new account). If you're not averse to dropping a few dollars and getting a network card (that is, if you don't have one already), you can use the network card instead of the USB port, which creates a much more dedicated data pathway (and a faster one, too!).

On the subject of network cards: like so much else in this world, you get what you pay for. Linksys is a good maker of reasonably inexpensive network cards that perform well at both 10 and 100Mbit speeds. Most cable modems now support full-duplex 100Mbit Ethernet — if you can use it, take advantage of it.

REPLACING YOUR CABLE MODEM

Most cable modem services now use DOCSIS 1.1, a universal standard for cable-based networking. Any DOCSIS modem can generally be swapped with any other DOCSIS modem, so if your ISP provided you with a somewhat dodgy one to start with, you can always upgrade it for something more robust.

3Com's SURFBoard is one of the best: it supports full-duplex 100Mbit networking and even has an emergency cut-off switch to disconnect your PC from the network if someone tries to hack you. It also supports both network and USB connections, depending on which way your PC is wired.

"UNCAPPING" YOUR CABLE MODEM

One acceleration technique that APC does not recommend is the practice of cable modem "uncapping" that has been gaining prominence in some circles of late.

Uncapping consists of changing a setting on the cable modem itself which controls the rate of data flow across the wire to the ISP. This value has been assigned by your ISP for a good reason: bandwidth isn't free, especially not for your ISP. And you're asking for trouble if you try to tweak your equipment in an attempt to use more than you're entitled to.

It's also quite easy for an ISP to detect, so if (or more likely, *when*) your ISP discovers your unauthorised "maintenance," its first response will typically be to cancel your account. Not only will you not have faster Internet access, you'll have no Internet at all! Furthermore, most Service Provider's acceptable use policies also provide for further action to be taken by them in the event of such tampering.

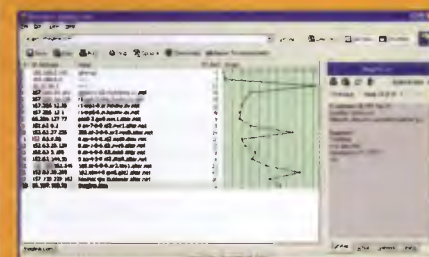
This means there is the potential for the provider to file charges against you for interfering with its ability to provide a service. In short, any added speed is not worth the risk. ■

HOW TO calibrate your network speed

Don't make changes blindly. The best way is to check your speed, tweak, and then check again. Having hard numbers to work with is better than operating on subjective opinions ("Well, it seems faster now...").

If you want to casually test routes and ping times to various destinations, one of the best tools for doing this is NeoTrace.

NeoTrace not only does graphical plots of the total time involved for each network hop, it shows you on a map of the world where each node is. The results can be logged and compared. This is a great tool, not just for checking your network speed but for trying to determine where along the way a particular route is falling.



NeoTrace graphically displays the time required to make every hop in a given network link.

You can also use utilities that are online, which give you detailed feedback and rank it against information gleaned from other users. For basic TCP information, head over to www.speedguide.net and use the "TCP/IP Analyzer" tool. This will tell you what your detected TCP settings are. For an actual speed calibration, go to www.dslreports.com and run the speed tests in the "DSL Tools" menu. You'll need to register with them to use it, but it's more than worth it.



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Broadband for MAC

No need to choose between fast Internet access and fancy Mac software. Steven Noble shows you how to use Telstra Bigpond or OptusNet Cable with OS X.

We all know that broadband Internet access is lightning fast, but both Telstra and Optus have been slow to support Mac OS X on their broadband networks. Luckily, both providers fully support Mac OS 9, and will actually set up your computer under Mac OS 9 when they install your ADSL or cable connection.

And while Optus will not provide technical support to Mac OS X users, neither provider actively prevents you from using Mac OS X on their networks. Telstra even supports the use of its LaunchPad cable-access software in Mac OS X's Classic mode.

So, let the Telstra or Optus personnel do their thing with Mac OS 9. Then, when you are ready to forgo Telstra or Optus technical support, consider moving up to Mac OS X using the simple steps outlined here.

OPTUSNET CABLE AND MAC OS X

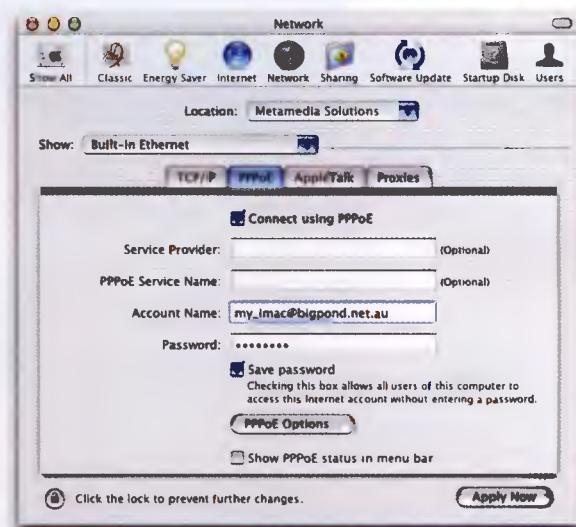
You don't need special software to access OptusNet's Cable network — everything you require is already built into both Mac OS 9 and Mac OS X. Nonetheless, an Optus technician will install a "tweaked" Web browser for Mac OS 9 that points to customer pages on OptusNet Cable's Web site.

Now restart in Mac OS X. Open System Preferences, Ethernet settings (choose Built-in Ethernet from the Show pop-up menu), Network panel, then the TCP/IP tab. Choose Using DHCP from the Configure pop-up menu. Leave the optional DHCP Client ID field blank.

Click the Apply Now button to save your changes and shut down your Mac and cable modem. Turn on the cable modem again, wait until all the lights are steady, then restart your Mac. You should now be online using OptusNet Cable and Mac OS X.

TELSTRA ADSL AND MAC OS X

Mac OS X includes all the software you need to get online with Telstra ADSL. In Mac OS X, start by opening System Preferences, Ethernet settings (choose Built-in Ethernet from the Show pop-up menu), Network panel, then the PPPoE tab. Now check the box marked "Connect using PPPoE," and enter your entire Bigpond email address as your user name and your password as password.



► Mac OS X's built-in System Preferences application is all the software you need to connect to Telstra ADSL.

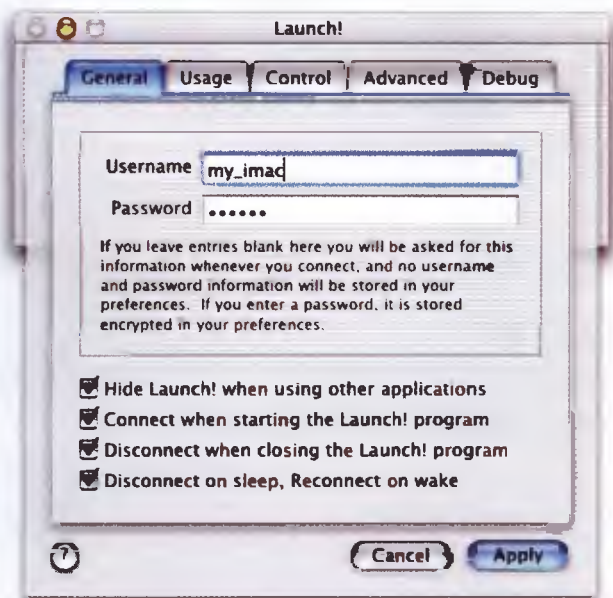
If you click the PPPoE Options button you'll find that you can instruct your Mac to automatically connect to the Internet whenever you start an Internet application.

Next, click the TCP/IP tab and select Using PPP from the Configure pop-up menu. According to the Mac Bigpond Broadband FAQ (whirlpool.net.au/faq-mac.cfm), you should leave the Domain Name Servers box in this section empty, regardless of what Telstra tech support tells you.

However, add "bigpond.net.au" (without the quote marks) to the Search Domains box, as well as "your_state.bigpond.net.au", where "your_state" is "nsw", "qld", "sa", "tas", "vic" or "wa". Once you're online, open System Preferences, Software Update, then click the Update Now button. This will ensure you are using the latest version of Mac OS X, which is important — the older versions Mac OS X 10.1 and 10.1.1 included a bug that slowed ADSL access to a virtual halt.

TELSTRA CABLE AND MAC OS X

James Curmi's Launch is a fantastic free program and the best means



► Launch is a breeze to configure.

of logging onto Telstra cable from Mac OS X. After Telstra's tech support personnel configure your Mac to access Bigpond cable using LaunchPad, you can restart in Mac OS X and connect to Bigpond by running LaunchPad in Mac OS X's Classic environment.

Once you're online, download Launch from curmi.com. It's Mac OS X native, so once you switch from using LaunchPad to using Launch you will be able to say goodbye to Classic.

Open System Preferences, Ethernet settings (choose Built-in Ethernet from the Show pop-up menu), Network panel, then the TCP/IP tab. Choose Using DHCP from the Configure pop-up menu, then close System Preferences, saving your changes.

Double-click Launch to open it, then select Preferences from the Launch menu. Under the General tab, enter the first part of your Bigpond email address (everything before @bigpond.net.au) as your user name and your password as your password. It's a good idea to enable all four checkboxes in the General panel, but leave the other panels alone at this stage.

Click the Apply button to save your changes, then the Connect button to connect to the Internet. Open System Preferences, the Login panel, then the Login Items panel, and add Launch to the list so that it will automatically connect you to the Internet whenever you start your Mac.

AWAY YOU GO

In the three scenarios APC has outlined on these two pages, you still need to configure your email program to use Optus or Telstra's email servers and your Web browser to use their proxy servers.

But the most important thing is that you're now online using broadband and Mac OS X. Your greatest challenges are behind. You can now look forward to some exciting times. ■

ADD AIRPORT TO THE MIX

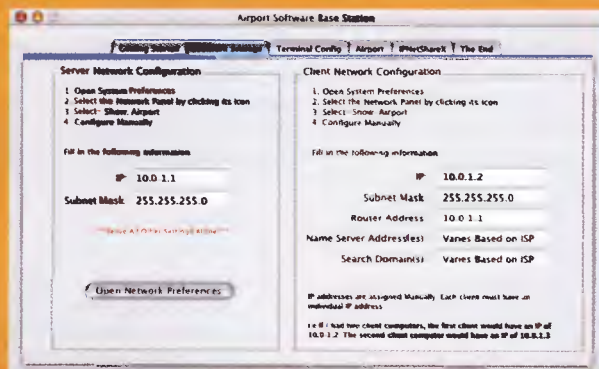
Broadband and Airport — a perfect match.

Broadband Internet access is "always on" and with Airport you can always use this Internet connection — whether you're lying in bed or relaxing in a backyard banana lounge. Broadband is fast, and with Airport you can share this speed with every Mac within range that has an Airport card — as long as your broadband access plan allows you to share your connection.



► An Airport Base Station will allow you to wirelessly share your broadband connection with many Macs.

For instructions on configuring an Airport Base Station to wirelessly share your broadband connection, download "Designing Airport Networks for Mac OS X" from the AppleCare KnowledgeBase (kbase.info.apple.com). Remember to temporarily disconnect the Airport Base Station whenever you restart or reset your cable modem. If you don't have an Airport Base Station but your Mac has an Airport card, you can use your Mac to emulate a base station, providing wireless access to all other Airport-enabled Macs. Will Clarkson (willclarkson.com) has created an application that's part tutorial, part utility, which walks you through the process of setting up your Mac as a software base station.



► This combined application/tutorial walks you through the process of setting up Mac OS X as a software base station.

A brave new wireless world

If you're thinking of connecting a home network to the Internet, Dan Corkery shows you how a commercial 802.11b wireless router can be ideal.

A wireless router is an ideal way to start your home or office down the road of wireless services. Not only does a router provide a solid architecture for future expansion, but it is provided at a cost that is significantly less than building it yourself.

Apart from integrating a 10/100Base T switch with a router, a wireless base station also offers other network features, including NAT, DHCP and MAC filtering.

Once you compare the cost of purchasing a wireless Ethernet access point and a switch/router to simply purchasing a wireless router, the "extra" outlay of a wireless router starts to diminish.

Most of the wireless routers we tested assume the presence of a ISDN or ADSL modem — only the Apple Airport had an internal modem. If you plan on connecting your network to the Internet via dialup, you'll need to connect one of your PCs to the Internet and enable Windows Internet connection sharing.

Most of these wireless routers allow you to connect up to three PCs to your high speed network, all whilst protecting them behind a firewall. The routers also provide additional network services — Dynamic Host Configuration Protocol (DHCP), Network Address Translation (NAT) and even printer sharing and Web site blocking based on keywords.

HOW WE TESTED

What we looked for:

- ease of setup
- ease of configuration
- strong signal strength
- good transfer times
- good technical support
- sensible design

We tested from three distances: our short range assessments were 5m

and 13m from our base station, and 28m for our long-range assessment.

All units were tested with identically configured Toshiba Satellite Pro laptops, using Windows XP or Windows 2000. The routers were placed on a shelf approximately 2m above the laptops.

Apple Airport 2.0 802.11b

Apple may have helped found the field of wireless networking with the Apple Airport 1.0, but does the Airport 2.0 make the grade?

Apple was one of the first to market with a commercial 802.11b device in 1999, with their groundbreaking Airport range of devices.

The Airport 2's curvaceous and space-age enclosure is similar in size to a rockmelon half, and surprisingly heavy. The unit is ceiling- or wall-mountable with a perspex bracket included. Its stylish, minimalist design means looks good.

The unit's rear-mounted ports consist of a single RJ-45 WAN port, a single auto-sensing 10/100 RJ-45 Ethernet port (which removes the need for a cross over Ethernet cable for uplink), a RJ-11 56K modem and a power input. An ugly and large third party power adaptor tarnishes the otherwise smooth exterior, while bright LEDs show power, RX and TX functions.

The base station is easy to set up and configure, but it would have been easier if Apple included some printed documentation. Despite carrying the Apple logo, there is a Java-based configuration application for Windows users and a "lickable" carbon application for Mac OS and Mac OS X.

Administration and state-based firewalling features are built in, although they are not terribly complex or comprehensive. A DHCP server serves up IP addresses to the network and hides them from the world using NAT and 128-bit WEP encryption. Remote Authentication Dial-In User Service (RADIUS) authentication support, if activated, ensures tighter network security.

In our testing, the Airport unit had the strongest signal — it maintained a connection no matter where we walked on the office floor — and showed excellent transfer times. Transfer speeds averaged at 3.26 Mbit/s — nearly twice the speed of the Belkin and Compaq units.

Verdict

- ✓ Simple, suave, stylish and secure.
- ✗ Only a single RJ-45 Ethernet port, no Web tool to aid configuration or printed documentation.

<< Details

Contact Apple Australia
Phone 133 622
Online www.apple.com.au
Price \$699





Belkin Wireless Access Router

A solid and reliable unit for small business use, this is let down by its lack of long-range capabilities.

Belkin has gone out of its way to create a product that is easy to set up and use. A clear and concise paper manual is included, but apart from some advanced features, you're not likely to need it. Still it's good to have just in case.

The blue coloured unit sports dual rotatable dipole antennae, which supposedly allow you to receive a stronger signal and reduce noise. However, in our tests the Belkin performed well at short distances (4.18Mbit/s at 5m and 0.553Mbit/s at 13m respectively), but was let down severely at our longest hop, where it transferred an abysmally poor 0.43Mbit/s.

The router supports a Demilitarised Zone (DMZ) and virtual servers, so you can allow certain addresses or network services through your network if you want to run Web or game servers from your home or office.

Configuration is simple and provided by a slick, Web-based interface, which is accessible from any browser provided you are connected to the base station.

The Belkin unit's internal security features include the ability to restrict LAN client access by day, time, or type of traffic. This could be used for monitoring the usage habits of an office, or blocking time-wasting sites.

With 128-bit WEP encryption activated, routing times degraded (due to the extra load on the CPU) but not to the point of interrupting an MPEG video playing from our test server.

Expandability is this unit's strong point — with three 10/100 Ethernet ports and one WAN port.



<< Details

Contact Belkin Australia
Phone (02) 4372 8600
Online www.belkin.com/anz/
Price \$700

Verdict

- ✓ Cheap, reliable and easy to configure, good size.
- ✗ Performance hit with 128-bit WEP encryption, transfer speeds a little slow, no external aerial port.



WIRELESS SECURITY

What's the easiest way to hack into a company's network?

Forget about sneaking around in covert *Mission:Impossible*-style penetrations. Just slip a wireless card into your notebook and head for the company's parking lot — or drive around the CBD armed with your laptop, a GPS receiver and some free monitoring software.

Also known as "drive-by hacking" or "war-driving," this method of illegally accessing networks is increasing as IT administrators and private citizens unwittingly leave their wireless networks open to the world.

Wireless networks are inherently less secure than wired systems. On a wireless LAN, eavesdroppers can be as far as 100 metres away from a wireless access point. Luckily, the inbuilt features of your wireless equipment combined with some common sense can greatly increase the security of your network.

Built into all Wi-Fi equipment is a series of security measures collectively called Wired Equivalent Privacy (WEP). WEP's encryption algorithm is used to protect wireless communication from eavesdropping and also to prevent unauthorised access to a wireless network.

Encryption is the process of encoding information in such a way that only the person (or computer) with the correct key can decode it. Encryption has been in use since the days of the Roman Empire, and the ability for the Allies to "crack" the ENIGMA encryption used by the German Army led to untold lives being saved on the European battlefield.

Continued on page 95 ➤

TIPS FOR SECURING YOUR WIRELESS NETWORK

- Only buy products that support 128-bit WEP encryption — both Access Points and PC/USB cards.
- Change your Access Point's password from the factory default.
- Use an non-obvious administration password for your Access Point.
- Use an non-obvious WEP password.
- If possible, shut off the ability to administer your Access Point from wireless clients.
- ORiNOCO and Apple's "closed network" feature won't accept connections from clients using the default "ANY" ESSID. If able, implement this on your Access Point.
- If you're working in an area where data privacy is essential (bank, credit union, police station etc.), run a software VPN tunnel over your wireless connection, too.
- Use Wired Equivalent Privacy encryption — a minimum of 40-bit encryption (128-bit is best) to protect your data.
- Restrict the MAC addresses of the Ethernet cards that can connect to the network.



Compaq iPaq CP-2W Wireless Access Router

HP/Compaq has a long tradition of serving the enterprise market.

Will this router meet your business needs?

With one RJ-45 WAN, four RJ-45 LAN (or three LAN and one uplink) ports mounted on the front of the device, the Compaq has expandability to go. Unfortunately, the Compaq is let down by its lightweight wall/ceiling mountable plastic casing, which feels cheap, and scratches easily.

Although printed documentation is becoming rarer, a 90-page user guide is included. Whilst setup was simple, the administration tool could benefit from the addition of a "wizard" interface.

A single aerial gives average broadcast performance over short distances, and the iPaq was the second fastest on test for short-range communications with a very respectable 4.84Mbit/s. However, over longer distances the connection was unreliable and it couldn't maintain a steady connection on our furthest placement.

The CP-2W's built-in NAT firewall rose to the occasion, and the CP-2W supports 64- or 128-bit WEP encryption, which enhances your data's security.

The CP-2W also has packet filtering; support for VPN (Virtual Private Networking), DMZ, and virtual-server settings. Paranoid users can specify the MAC-addresses of the machines that can connect to your LAN — perfect for stopping drive-by hackers.

The Compaq would be ideal for small workgroups or offices, but home users who want to work in the garden or loft might find the unit slower or more unreliable than the other units on test.



<< Details

Contact Compaq Australia
Phone 1300 301 234
Online www.compaq.com.au
Price \$600

Verdict

- ✓ Excellent documentation.
- ✗ Cheap casing, poor signal strength over long distances.



Micronica Mercury Wireless Access Router

A four-port switch and firewall/router with an added print server — this is perfect for the SOHO user who has expandability in mind.

Engineering sample — two words that cause sweaty palms in geek-land. However, like a blind date, sometimes things don't pan out the way they should.

Out of the box, the Micronica didn't work with our testing combination of a fixed IP address and a D-Link ADSL modem. A call to the friendly Micronica helpdesk didn't sort it out, but they did bend over backwards to try and solve this problem — even emailing us on the weekend. However, this was a sample unit and I think with a bit of extra fiddling the fixed IP would work.

Luckily, when we connected the Micronica to a PPPoE DHCP Telstra BigPond cable account the unit worked as advertised. The fixed IP issues prevented us from comparing its transfer speeds against the other units. However, at short ranges indoors it never dropped below 11Mbit/s, and was accessible from a park 30m across the road, which is fairly good in our book.

The front of the unit has WAN, uplink, four Ethernet ports, and a set of rear-mounted serial and parallel ports which allow you to use the box as a network printer. Simply connect the printer to the unit, install some drivers on your PC, and you're printing.

Once the fixed-IP issues are resolved, the Micronica unit would be perfect for use on a home LAN or small business. Its expandability, rugged construction and versatility make it a worthy contender for your hard-earned dollars.



<< Details

Contact Micronica Australia
Phone (03) 9699 8844
Online www.micronica.com.au
Price \$522

Verdict

- ✓ Rugged construction, expandable, print server.
- ✗ No external aerial slot, fixed IP configuration issues.





Netgear MR314 Wireless Router

A sturdy construction and smooth configuration are the Netgear's main strengths.

The Netgear's solid blue, LED-dominated box is virtually indestructible. Vents on the side of the unit shed heat, and it also has a Kensington lock mount which allows you to chain the unit to something big and heavy. A nice touch is that the unit is stackable and the single aerial is rear-mounted.

On the back is a power input, as well as one RJ-45 WAN and four LAN ports. The MR314's radio is an Intersil PRISM II-based, modified MA401 PC Card, plugged into a connector on the circuit board.

Configuration of the MR314 can be performed via the Web configuration utility (which we recommend), or Telnet.

Firewalling, DHCP and NAT services are all built-in, but unfortunately there are no port filtering services. Security is provided by 64- and 128-bit WEP, and MAC address association control.

Setup was a breeze, and within 20 minutes we were surfing the Net (and that included downloading the PDF manual from NetGear's Web site).

The Netgear had the fastest transfer times in our tests — 4.04Mbit/s, more than 0.76Mbit/s faster than the Apple Airport.

An interesting feature of the MR314's is the URL keyword content filtering, which could be useful for blocking inappropriate sites.

The only flaws we found with this unit was the throughput noticeably decreased when we enabled 128-bit WEP, and an external, "booster" antenna cannot be attached.



<< Details

Contact Netgear Australia
Phone 1800 787 638
Online www.netgear.com.au
Price \$599

Verdict

- ✓ Rugged construction, expandable, telnet configurable.
- ✗ Slows down with WEP enabled, no external antenna connection, no port filtering.



WIRELESS SECURITY

Continued from page 93

Using a "packet sniffer," a hacker can grab packets from the network and read the text inside. However, if the data inside is encrypted, they have to decrypt it first.

Under public key encryption (used in WEP), the original message (or plain text) is run against a combination of a hashing algorithm and a hash key. This generates a hash value, also known as cipher text. To turn the hash value back into the original plain text, you have to know the Hashing Algorithm, and also the exact hash key.

Public keys generally use complex algorithms and very large hash values for encrypting, which in WEP's case are 40-bit and 128-bit numbers.

A 40-bit key has 240 possible combinations whilst 128-bit has 2,128 combinations.

TYPES OF ENCRYPTION ATTACKS

Dictionary attacks rely on the fact that people would rather use a password like "bob" than "\$wert". It has a list of possible passwords, and it will run those through the dictionary first to see if anyone has an incredibly obvious password.

A "brute force attack" is where the password cracking program tries every single combination of password available. This can take a huge amount of time.

As there are well known flaws in the 40-bit algorithm that mean it is easy to decode or "crack", APC recommends that you implement a minimum level of 128-bit WEP security.

In addition to encryption, there are several things you can do to increase the security of your network. After all, it is no use dead-bolting the front doors if you've left the back door unlocked.

Security is a process — and it can always be improved. Simple procedures, such as changing passwords regularly, not using the default administration passwords and password protecting your network resources can also mean that hackers will "borrow" someone else's bandwidth.

SECURITY PROCEDURE CHECKLIST

- Physically secure the network.
- Physically secure the premises.
- Monitor the network for unusual network traffic.
- Use a firewall.
- Password security.
- Change passwords often.
- Use non-obvious passwords.
- Permissions security.
- Make sure your computer isn't set to share all of its C:\ drive.
- Secure each piece of equipment to the value of its loss.

Wireless Is more

Wireless Ethernet is perhaps most valuable to the road warrior. Dan Corkery discovers that PC Cards offer portability, low power consumption and a smaller form factor than their USB brethren.

Three prominent chipsets dominate the 802.11b market. Far and away most popular is the Intersil PRISM chipset — the basis of the Micronica and D-Link cards. With drivers available for Linux, FreeBSD and nearly every version of Windows, the PRISM II chipset is a good performer, and cheap to boot.

Shipping in PC Card form since 1999, the Lucent/Orinoco Wireless chipset is significantly slower than the PRISM II chipset, although it seems to have greater signal strength over longer distances.

External aerials, usually about 1in wide, are a necessary evil. As they stick out of the side of the laptop, they must be removed. A velcro-able aerial to stick to the back of the laptop screen seems to be a logical choice, yet only one manufacturer (Lucent) has seen fit to include an external aerial. Hardware hackers, or those seeking to roam far from their desk, are advised to use a card that has an external aerial port — such as the Toshiba 802.11b PC Card.

Laptops with a 802.11 PC Card are more location-sensitive than USB 802.11 devices. As such, walking around the office with a signal strength monitoring application open might gain you an additional Mbit/s or so.

But, if you don't want to trek the PC Card route, many manufacturers, including IBM, Toshiba and Apple are now including 802.11 aerials in the chassis of their machines — which add the promise of extended range and better transfer times. Check with your manufacturer before taking the leap.

Convergent evolution means that most of the cards in this review look and function in an almost identical manner, despite them being slight variations of the same design

HOW WE TESTED

All 802.11 cards were tested with identically configured Toshiba Satellite Pro laptops, using Windows XP or Windows 2000, with the card placed in the

uppermost PC Card slot. All cards connected to the Apple Airport 2.0 wireless router, which was placed approximately 2m above the laptops.



Toshiba Wireless LAN 802.11b

This is a solid Orinoco wireless card, but will the newer cards beat it for speed?

Toshiba is not out to fool anyone with "their" Wireless LAN card when it has "Lucent Technologies" printed in the upper right-hand corner.

Luckily, Lucent gear has always been rock-solid. The company was one of the early players in wireless Ethernet, and their wireless division was eventually spun off into Orinoco Wireless. This chipset has been around for nearly two years, and it supports nearly every operating system out of the box — even FreeBSD and Linux drivers are available on the Web.

Mac OS and Mac OS X users on older, PC Card slot-equipped laptops should be able to use the card with the inbuilt Airport drivers in Mac OS 9 and later. This shares the same chipset as the Orinoco card, which is supported by Apple Mac OS 7.5.2-9.2.

The Wi-Fi certified card had the largest aerial in the test — a slight inconvenience when compared to the loss of poor signal quality. With signal strength, this card is the gold standard and the standard the other cards should aim for. However, this signal strength didn't equate into good transfer times.

At point A (5m from our base station), the Toshiba came in the slowest at 3.37Mbit/s. From point B (13m from our base station) it again led the bottom of the pack, and at point C (28m from our base station) it was a full 1.6Mbit/s behind its competitors.

Of all of the cards, the Toshiba was the easiest to install and set up. Windows XP recognises the device and installs the drivers from the hard disk, removing the need for the driver CD-ROM.

Two unlabelled LEDs indicate RX/TX and network presence, but this is offset by the ability to connect an external aerial, which can increase the range considerably.

But, be warned, this card is reaching the end of its life. If you run non-Windows operating systems, or need bomb-proof signal strength, this is the card for you.

Users of Windows who have the need for speed should look towards one of the PRISM or PRISM II cards.

Verdict

- ✓ Drivers available for most operating systems, external aerial, nice PC Card cover.
- ✗ Slow transfer speeds.

<< Details

Contact Toshiba

Phone 13 30 70

Online www.toshiba.com.au

Price \$205





Xircom Credit Card Wireless Ethernet Adapter

Chip-maker Intel may have bought Xircom, but can it buy the company's much-vaunted quality?

In January 2001, Intel purchased US card maker Xircom to bolster its mobile communications offerings. Running as a separate brand, Xircom is still producing high-quality and affordable PC Cards.

Drivers for the CWE1100 are provided for Windows 95/98/NT/2000/XP, and the card is Plug-and-Play compatible. This makes for very easy and straightforward installation — for instance, in our tests we were up and running in under 15 minutes, including the time it took to download the drivers from

the Web site.

Xircom's 802.11b is a re-branded Cisco Aironet Type II PC card that protrudes about an inch out of the PC card slot. Installation is a snap and the card, using the Intersil PRISM's chipset, quickly associates with wireless access points in the area.

Connecting to a specific point requires setting the service set identifier (SSID), also known as the Wireless Network Name. Unfortunately, users can only add three SSIDs, which can be an annoyance when trying to roam between multiple locations. Corporate users with non-roaming networks should stick to one of the other cards, or be prepared to wait until the software is revised.

Average speeds for the card were near the bottom (4.763Mbit/s) of the 802.11b pack — although it managed to squeeze in the fastest times (5.36Mbit/s) for our longest and most cluttered hop.

<< Details

Contact Intel
Phone 1300 363 018
Online www.intel.com.au
Price \$255

Verdict

- ✓ Easy installation.
- ✗ Average transfer speeds..



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Micronica Mercury PM802 802.11 adaptor

Micronica is one of the smaller players in the 802.11b space — but how will this newcomer survive playing with the big boys?

Melbourne-based Micronica has rebadged a GFE card, which is based on the Intersil Prism chipset.

Once we opened the utilitarian packaging and discovered that there is no printed manual, we found the Micronica identical in appearance to the D-Link card. Unfortunately, the drivers are not intercompatible.

A small, fan-shaped aerial protrudes about 2cm from the laptop, and (together with the D-Link), is the smallest of the bunch. Whilst small in size, the "hooks" on each side of the aerial manage to snag and pull on cabling and clothing.

The card has wide driver support, and supports Windows 95 (OSR2)/98/2000/ME/NT/XP as well as Pocket PC 2002.

Drivers for Windows 95/98 and Windows 2000 are included on a floppy disk, which could present problems for laptop users. As more and more laptops are shipping without floppy devices, it is unusual that Micronica would ship a floppy-based driver set.

Users of Windows XP will have to download the drivers from the Web. Hopefully, later revisions of the card will ship with all of the drivers on a CD-ROM.

Once we had the card running it performed quite well, and at our close range (5m) tests, it gave an excellent 5.5Mbit/s. The Micronica achieved an average of 4.7Mbit/s over all three ranges.

<< Details

Contact Micronica Australia
Phone (03) 9699 8844
Online www.micronica.com.au
Price \$236

Verdict

- ✓ Small aerial, supports a wide range of Windows OSes, Linux and PocketPC 2002 support a bonus.
- ✗ XP drivers not included, floppy-based drivers, no links to drivers on its site, no documentation.



Belkin Wireless Notebook Network Card

A cheap and cheerful PC Card with good documentation, just be wary during configuration.

The Belkin card has a smooth design, professional documentation and a relatively painless driver install. The antenna design is a full-width extension of the card, and is sheathed in black plastic. An unmarked amber LED shows link and network activity.

Build quality is highly professional. The card occupies a single PC Card slot, and the aerial is low profile — you could squeeze two devices into the laptop if you wished.

Overall, installation of the card was simple, and XP drivers were provided on the included CD-ROM. Configuration, however, was not so easy. Once installed, the card would not want to find any non-Belkin network hubs — the notebook card indefinitely scanned the network looking for base-stations. The card didn't even report that it wasn't working, that there was no network available, or even that there were available networks that it couldn't successfully connect to.

The problem turned out to be a configuration issue. Under the authentication tab an "Enable network access control using IEEE 802.1X" was checked. Deselecting the tab immediately enabled us to see the network. Why this option is selected by default is a mystery.

As the card is installed as an NIC as opposed to a Wireless NIC in Windows XP, you have to know what the SSID of the base station is before you can connect to it. Once configured correctly, the PC Card card performed admirably, averaging a speed of 4.9Mbit/s over our three tests — only 0.03Mbit/s slower than the fastest 802.11b card.

The inbuilt LED notified us when we began to roam out of the range of our wireless base-station.

The PC Card adaptor supports 64- and 128-bit WEP encryption for security, and enabling full 128-bit WEP encryption only impacted performance minimally.

<< Details

Contact Belkin Australia
Phone (02) 4372 8600
Online www.belkin.com
Price \$199.95

Verdict

- ✓ Good hardware design, free life-time warranty, 24-hour technical support.
- ✗ Difficult to configure, cannot attach external aerial.



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Netgear MA401 802.11b Wireless

Netgear has a reputation for solid and practical networking products — but can this card live up to the expectations?

Netgear has a reputation for solid, no fuss equipment and the Netgear MA401 is no exception. Based on the Intersil Prism II chip set, the card performs well in a variety of conditions.

A "Link" LED on the antenna section shines steadily when the card has a wireless network "infrastructure" connection. The LED doesn't flicker to indicate network activity.

After inserting the card into our Windows XP laptop a "Stop" error was generated — a very rare occurrence these days. After a quick switch to another laptop, we discovered that the Windows XP drivers weren't on the disk, but were easily located on the Netgear Web site.

The included Neesus Datacom Wireless LAN Configuration Utility software is difficult to use and unnecessary. Once installed, the Netgear seemed to think that it was a LAN card, as opposed to being a Wireless LAN card. Once you specify the SSID, you're rolling.

The 401 card supports both 40- and 128-bit WEP encryption and the driver also supports roaming among Access Points.

The Netgear was the fastest 802.11b card in our test — averaging 4.93Mbit/s throughout the three tests. It gave a solid performance, but lost out due to its poor configuration utility.

<< Details

Contact Netgear Australia
Phone 1800 787 638
Online www.netgear.com.au
Price \$229

Verdict

- ✓ Fastest on test, good documentation, includes Linux drivers.
- ✗ Average configuration software, appears as a NIC card, not as a wireless card.



D-Link Air 802.11b Wireless LAN Adaptor

D-Link has a reputation for making consumer networking easy, but will it make our testers smile?

Like many of the cards on test, the D-Link Air is based on the Intersil PRISM chipset. Apart from differing drivers and configuration utilities, the only way to visually distinguish between the Micronica and the D-link card is to look at the colour of the antenna.

Using a slower 16-bit PC Card interface, as opposed to Cardbus, the Wi-Fi certified DWL 650 is not recognised out-of-the-box in Windows XP. However, under Windows 2000, the drivers installed simply and easily.

Once the drivers were installed, the card connected to the "default" SSID, allowing a quick connection between two D-Link cards. The configuration utility, based on the average Neesus Datacom's utility, would not connect to the card to allow us to set the SSID to our wireless LAN. However, after uninstalling the card and reinstalling the drivers, the card worked flawlessly.

A single "Link" LED on the antenna section shines steadily when the card detects a signal from another 802.11b station. However, the LED doesn't flicker to indicate network activity. The problem of the card working under ad-hoc mode with intermittent drop-outs has also been reported.

Speeds for the D-link air were inconsistent — achieving a healthy 5.156Mbit/s at 5m, and 5.15Mbit/s at 13m. It was, however, let down by the second-slowest time at our furthest base station (28m) which lagged by nearly a full Mbit/s.

The DWL-650 is an average performing 802.11b client card, and priced aggressively, especially for a card supporting both 40-, 64- and 128-bit WEP encryption.

<< Details

Contact D-Link Australia
Phone (02) 9417 7100
Online www.dlink.com.au
Price \$196

Verdict

- ✓ Small aerial.
- ✗ Hellish to set up, Windows XP support patchy.



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Access all areas

The wireless access point provides a cheap and easy bridge between your wired and wireless LANs. Dan Corkery checks out three of the latest and greatest.

Sitting somewhere between a wireless router and a PC Card is the wireless access point. Designed to bridge a wireless LAN with a traditional wired LAN, the average wireless access point is incredibly easy to install and configure. It's a simple case of plugging the unit into an available 10/100 RJ-45 Ethernet port, powering it up, and you're away.

Wireless access points are cheaper than wireless router units, roughly one-half to one-third of the price. Some of these units are so cheap that you could purchase a PC Card or USB adaptor and an access point both for under \$700.

All of the access points we looked at are wall or ceiling mountable — with varying degrees of success. The popular and expandable Toshiba unit is about the size of a large textbook, whereas the Belkin access point is about the size of a Palm handheld. Forthcoming access points from Nokia will be small, weatherproof and, believe it or not, paintable (so your wireless network won't clash with your walls!)

None of the units we tested supported power over Ethernet — a feature that allows you to power the device via the RJ-45 network cabling.

Wireless access points are most useful in corporate environments, or those areas that already have an Ethernet network installed. As there are no "smarts" on the access point, they do not require as much configuration as a wireless router. Access points should ideally be low or no maintenance, and at the same time be rugged and dependable, just like the ones we've tested here.

HOW WE TESTED

All 802.11 cards were tested with identically configured Toshiba Satellite Pro laptops, using Windows XP or Windows 2000, with the card placed in the uppermost PC Card slot.

All cards connected to the Apple Airport 2.0 wireless router, which was placed approximately two metres above the laptops.



Belkin Wireless Access Point

Sturdy design features don't make up for the Belkin's lack of compatibility with non-Belkin base stations.

Sometimes life is too short. If you don't have the time or patience required for the Belkin wireless access point, then maybe you should skip to the next review.

The unit is well built, sturdy and has dual dipole antennae. Its single Ethernet port at the back allows you to bridge an existing wired LAN to a wireless device. However, the small cooling holes at the top could allow dust and grit to find their way inside, which really excludes this unit from being installed in industrial environments.

But what the Belkin gains in style it loses in incompatibility. Of all the products we tested, this was the most difficult to start working — it simply would not recognise the existence of a non-Belkin base station.

We couldn't connect to the Apple Airport, Compaq iPaq and Micronica base stations (reviewed in this issue). The Belkin access point just sat there and scanned the 2.4GHz frequency trying to lock into a signal it couldn't find.

Once configured and connected to a Belkin base station, the device was quite speedy. However, speed is nothing if you can only run with certain equipment. Belkin has forgotten that wireless Ethernet is about interoperability, and the days when a vendor could ship equipment that only ran on their particular hardware are well and truly over.



<< Details

Contact Belkin Australia
Phone (02) 4372 8600
Online www.belkin.com
Price \$500

Verdict

- ✓ Solid construction, nicely designed unit.
- ✗ Unable to recognise non-Belkin base stations, expensive for a one-trick pony.





Netgear ME102 Wireless Access Point

Netgear's unusually average ME102 Wireless Access Point is out of character when compared to their other products.

The blue-boxed ME102 has two external non-removable dipole antennas which allow you to position the unit however you like — even on a ceiling or wall. However, the build quality of the unit is not up to Netgear's usual standards. It is quite large — similar in size to a paperback novel — and most of that feels like empty space.

In our test corporate network, the machine balked and refused to allow the access point to be configured. We tried using the USB configuration utility but it failed to modify any of the parameters that we specified.

However, once we connected it to a PPPoE connection on our LAN, the unit truly shone. We were able to get a signal from 100 metres away — and the speeds were excellent.

We are unsure as to why Netgear included the USB configuration tool — why not just save the expense of using USB controllers and use the Ethernet port for configuration instead?

Apart from USB support, the 102 also offers SNMP over Ethernet administration methods. Both methods require the use of different Windows-based programs, so if you're using any other OS, you're out of luck.



<< Details

Contact Netgear Australia
Phone 1800 502 061
Online www.netgear.com.au
Price \$199

Verdict

- ✓ Shows wireless and Ethernet statistics, performance versus range quite robust.
- ✗ Can't attach "booster" antennas, USB configuration adds price but little functionality.



Toshiba AP-1000 Access Point

A commercial grade access point that will perform without issues, day in, day out.

Quite heavy and made of sheet metal, the Toshiba AP-1000 access point consists of a base-plate, a main unit with two PC Card slots, and a white plastic cover. The plastic cover is purely cosmetic, and can be removed in a server-room environment with no ill effects.

The access point features dual PC Card slots, an 11Mbit/s gold 128-bit card, and architecture which allows you to build an extension to your wireless network without expanding the wired backbone. The Windows-based SNMP compliant AP Manager makes the access point easy to configure. The AP-1000 is also interoperable with other manufacturers' high-speed IEEE 802.11b (Wi-Fi) compliant systems.

APC knows of one company that has been using one of these access points for the last two years. During that time it has been on permanently and hasn't once faltered. Even in a server room filled with electronic equipment the signal was strong and relatively noise-free.

The AP-1000 has excellent site-survey and link-testing tools, as well as superior AP and client-configuration managers. The Orinoco AP Manager software makes installation and configuration remarkably easy. And thanks to the included HP OpenView plug-in, you can manage multiple Orinoco AP-1000s remotely.

However, the price is high for most home users, who would be better placed going with a Apple or Netgear based solution.

In a concession to expandability, the unit includes slots for two different PC Cards — which means you can double the available bandwidth for the Access Point.



<< Details

Contact Toshiba Australia
Phone 13 30 70
Online www.toshiba.com.au
Price \$2,063

Verdict

- ✓ Excellent site-survey and link-testing tools.
- ✗ Big, heavy, and requires a PC card to operate.



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Make that connection

Managing data between networks has been recognised as a mission-critical application.

Matt Overington investigates some key routers.

Differences between routers and hubs have sparked much confusion. While it's true that many of a hub's tasks are duplicated by a router, a router is a device that lets data flow between networks as opposed to within a single network.

If someone on your network is sending large files, the network performance for all users will drop. This is largely due to the way that Ethernet transfers data. When a data packet is sent from one user to another on an Ethernet connection, the data is seen by all the users on the network. If it were possible to expand a single Ethernet network to include an infinite number of users, performance would soon slow to a crawl under the strain.

Imagine that you have two separate networks, but you want to send data between them. A router will connect the two networks but will also divide the network traffic and act as a buffer between the two. The computers on network "A" cannot see the computers on network "B", but the router acts as a post office to redirect any data packets that are sent between networks. If a computer on network "A" wants to send a data packet to network "B", it must send it through the router.

Routers are used to divide large networks into smaller groups so that each network will be able to perform efficiently. Similarly, you can use a router to connect your internal network in either your home or office to the Internet.

The router decides where each packet should go according to a configuration table. A configuration table can range from a couple of lines in a simple router right up to hundreds of kilobytes in size for a large, complex network. The configuration table contains information on which connections lead to a particular set of IP addresses, the priority connections, and rules for handling traffic.



Compex Netpassage 15B

With a top quality range of features and protocols this is a smart option for the home or small office user.

The most impressive routing device was the Compex Netpassage 15B. It acts as a DHCP server, and supports NAT, and PPPoE (Point to Point Protocol over Ethernet). There is also built-in support for Telstra's BigPond Cable connections, which is extremely useful for Australian users as routers often have problems with Telstra's cable. Telstra uses a ping (heartbeat) to discern whether a user is connected to a cable connection, and if no response is received, the connection is lost.

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Many routers cannot handle the heartbeat correctly, which leads Telstra to think that you aren't connected, and so your cable connection is dropped. BigPond users simply need to click through a wizard to adequately configure the Netpassage, but if you are using any other provider you will have to configure the connection manually.

Unlike the NetGear router, the Compex device doesn't have any imposed user limits, so to achieve optimum network performance you'll have to plan and configure your connections. You can address up to 253 individual users straight from the box, although the most you'd ever want to run off a single 10/100-base router would be around 30.

Some basic filtering functions are also included with the Netpassage. You can use it to control the access your users have to other networks. The filtering works by blocking packets that contain user-defined strings (such as an MP3 file header). The filtering can be based on either a connection time limit or on the time of the day.

The configuration software runs from a browser, and we were online and surfing through the Netpassage in around 15 minutes.

If you know how a router works and how to configure a network, this is the router for you. But, if you don't like to tinker and have no need for some of the Compex's advanced features, consider either the NetGear or D-Link models.



<< Details

Contact Lan 1
Online www.lan1.com.au
Phone 1300 301 053
Price \$399

Verdict

- ✓ Extensive list of features and supported protocols.
- ✗ Cverkill for some home users.

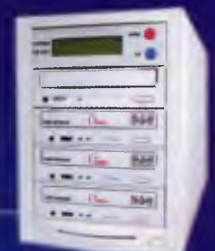
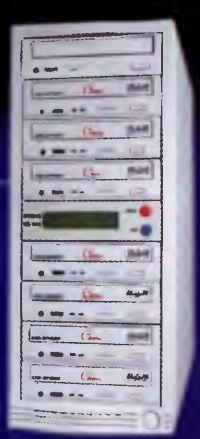




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D-Link DI-804 Cable/DSL Internet Gateway

D-link's range of networking equipment is extensive and is suitable for virtually any type of small network connection.

The DI-804 is a gateway router with a 4-port switch that sits with the DI-701 and DI-704P as an Internet Server/Firewall. It also has support for a maximum of 253 users, which is far more than you'd ever want to connect through a single cable connection.

There is an uplink port on the device, so you can daisy-chain multiple routers off the single connection. The DI-804 is best configured using the PPPoE, although you will have to check if your ISP supports it.

The documentation is clear and concise, and the configuration software is all handled via a browser. The configuration application is straightforward, and configuring the router is a task that'll take no more than 15 minutes. The DI-804 now has firmware that supports Telstra BigPond cable, and you don't need a separate software client to log on to the service. However, you will still need to manually configure other services, but as Telstra is the hardest network to get connected to, this will be of great help.

The DI-804 supports Virtual Private Networking (VPN) connections, and enables both PPTP Client/Server pass through and L2TP pass through. DHCP relay is also provided for, and you can let routers on the other side of the DI-804 assign addresses to clients daisy-chained off the single device.

The rudimentary filters work based upon IP, Protocol, or Port Number, but there are no time-based locks on connections.

You can stop members of your network from accessing specific sites, or IP ranges, but any additional monitoring or blocking will have to be done on the client PC. You also can set an administrative password for the entire router if you need to restrict all access between networks.



<< Details

Contact D-Link Australia
Online www.dlink.com.au
Phone 1800 177 100
Price \$322

Verdict

- ✓ Solid routing functions, good list of protocols
- ✗ Filtering functions are extremely basic.



Micronica SOHOMate HiP-400

The SOHOMate HiP-400 delivers excellent bang for buck, even if it looks fail to excite.

Traditionally, PC hardware vendors have been less obsessed with the appearance of a product than how it functions. The HiP-400 is a perfect example of function triumphing over form. A no-frills router, the HiP-400 would look out of place sitting on a desk next to an iMac, but it excels at doing what it was designed for.

Other than its appearance, the SOHOMate HiP-400 is hard to fault, and is packed with features that help make it more useful in a small office environment. Telstra's heartbeat is supported straight from the box, so you needn't worry about connecting to the BigPond network. There is a 9-pin serial port at the rear of the router, allowing you to plug in an external 56K modem and share the modem connection between the computers attached to the unit. If the modem support wasn't enough, the HiP-400 also features a print server so you can share printers via its built-in parallel port.

The router/Internet sharing is platform independent, but the print server drivers are only available for Windows or Linux. When installing the software, you can configure the print server, which works by assigning a port on the network to the printer.

Like the majority of hardware routers that APC has looked at, the HiP-400 is configured via a browser window. There is a basic NAT-based firewall that is included with the device, and the settings are also accessed via the browser interface. All unauthorised attempts to access your network are logged.

There is also VPN support, which enables multiple Point-to-Point Tunneling Protocol (PPTP) sessions and IPSec passthroughs.



<< Details

Contact Micronica
Online www.micronica.com.au
Phone (03) 9699 8644
Price \$417

Verdict

- ✓ Excellent performance and easy to configure.
- ✗ Limited filtering capabilities.



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SIS 650/SIS 961 Chipset
Support Socket 478 Intel Processors
Two DDR DIMM supports up to 2GB PC1600/PC2100 DDR DIMM
Supports AGP 4X, and 6 USB ports (1.1)
Onboard Realtek 8100 10/100 Ethernet
Supports UDMA ATA 100/66/33 IDE Interface
Onboard AC97 audio

MV42N



VIA P4M266/VT8233 Chipset
Supports Socket 478 Intel Processors
Two DDR DIMM supports up to 2GB PC1600/PC2100 DDR DIMM,
Two SDR DIMM supports PC100/PC133
Supports AGP 4X, and 6 USB ports (1.1)
Supports UDMA ATA 100/66/33 IDE interface
Onboard VIA VT6103 10/100 Ethernet
Onboard AC97 Audio support

AV45GTR



VIA P4X266A/VT8233 Chipset
Supports Socket 478 Intel Processors
Three DDR DIMM supports up to 3GB PC1600/PC2100 DDR DIMM
Supports AGP 4X and 6 USB ports (1.1)
Support UDMA ATA 100/66/33 IDE interface
Onboard High Point 372 ATA-133 IDE RAID support
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NetGear FR314 Firewall Router

The FR314 is a solid performer with few bells and whistles but is quick to configure and easy to maintain.

NetGear's FR314 is an Internet router that also functions as a firewall to help protect against denial of service attacks. As network hardware is often located in dusty, dirty environments away from where a PC would normally be used, build quality is imperative. The FR314 is housed in a rugged metal case, and is arguably the toughest of all the routers we examined.

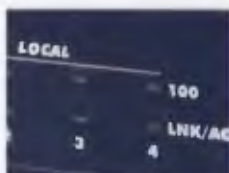
The FR314 is capable of handling single Static IP, single dynamic IP, or PPPoE WAN connections, but unfortunately there is no support for the RoadRunner TAS login.

A serious limitation is that it only supports eight users straight from the box. You can pay to upgrade the FR314 so that it will support up to 45 users, but full functionality should be provided when you buy the hardware in the first place. We'd expect that the performance of the unit would be slow if you tried to connect more than 20 people to a network using the FR314.

The time-based firewalling capabilities of the FR314 are solid and useful, although the filtering functions are very basic. You can configure the device to block ActiveX, Java applets, Cookies, or access to WAN-based Proxy servers, in addition to entering a list of banned domains or hotwords to search for.

Although the user limit was irritating, the biggest source of frustration was its handling of domain and host name assigning. If you opt to use the NAT with Fixed Address addressing mode, you lose the ability to name your host.

Ideally, the router should permit you to name the host and then afterwards assign an address to it.



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A HEARTBEAT AWAY

If you are having problems connecting to the BigPond cable network — or more accurately, staying connected — then the heartbeat could be to blame. When you are connected via Telstra cable, the server sends you a ping (heartbeat) to make sure you are still connected. If your computer doesn't respond, you will be disconnected. Telstra supplies software called "Launchpad" for each cable account, which takes care of responding to the heartbeat and logging you into the network.

When getting connected, the Launchpad software supplied by Telstra is one of the biggest headaches that BigPond users have to deal with. The Mac version of Launchpad tends to keel over if you are performing CPU-intensive tasks, like gaming or rendering, making online Quake III sessions almost impossible for Mac users.

Thankfully there is software to help you connect to the BigPond network without using Telstra's software.

VPN configuration across a Telstra BigPond cable connection is possible, but special steps must be taken. You can find out more about the heartbeat by visiting The Oz Cable Guy Web page (www.ozcableguy.com/heartbeat.html).

BPA LOGIN

<http://bpalogin.sourceforge.net/>

BPA Login is an open source login client for BigPond networks. It is not 100% stable, but the project has been ported to Windows, Linux, OS/2, AmigaOS, BeOS, and Mac OS X. William Rose is responsible for ongoing maintenance.

BPA LOGIN MAC

<http://users.bigpond.net.au/adrianb/>

BPA Login Mac is the best client for the Mac platform, and is well worth the installation. It works under Mac OS 9 and was written by Adrian Bourke.

LAUNCH!

<http://homepage.mac.com/curmi/FileSharing.html>

Launch is a customised version of BPA Login that is designed to work with OSX. It has been modified to include a GUI front-end and is written by Jamie Curmi.

WINCABLE

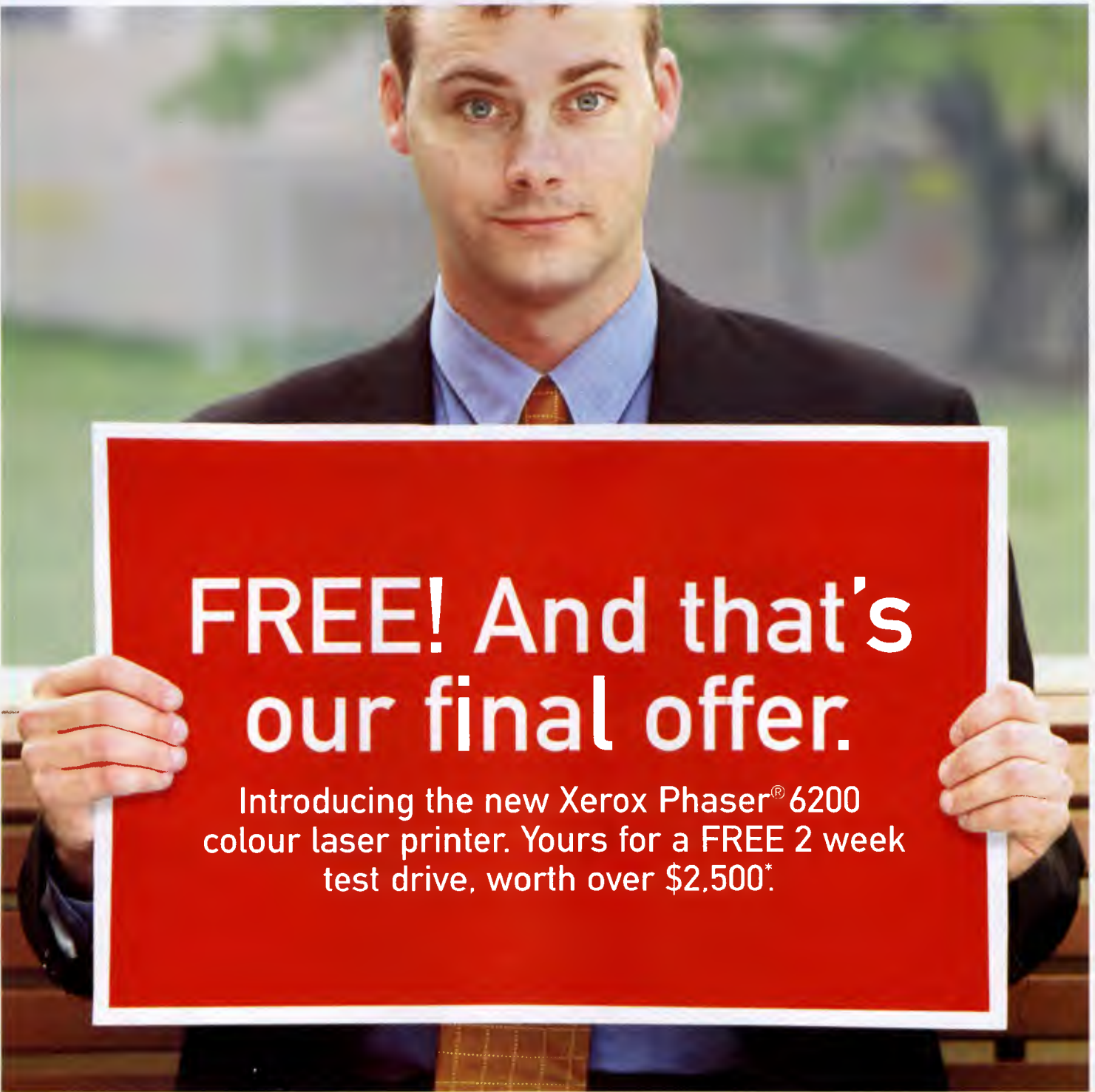
<http://users.bigpond.net.au/raven/>

WinCable costs \$20 per license and is probably the best alternative for Windows users. Scott Campbell has also written NTCable, which runs as a service under Windows NT, and a BeOS version is also available. This is the best login application we've found.

Verdict

- ✓ Easy to configure, good firewall capabilities.
- ✗ Eight user limit straight from the box.





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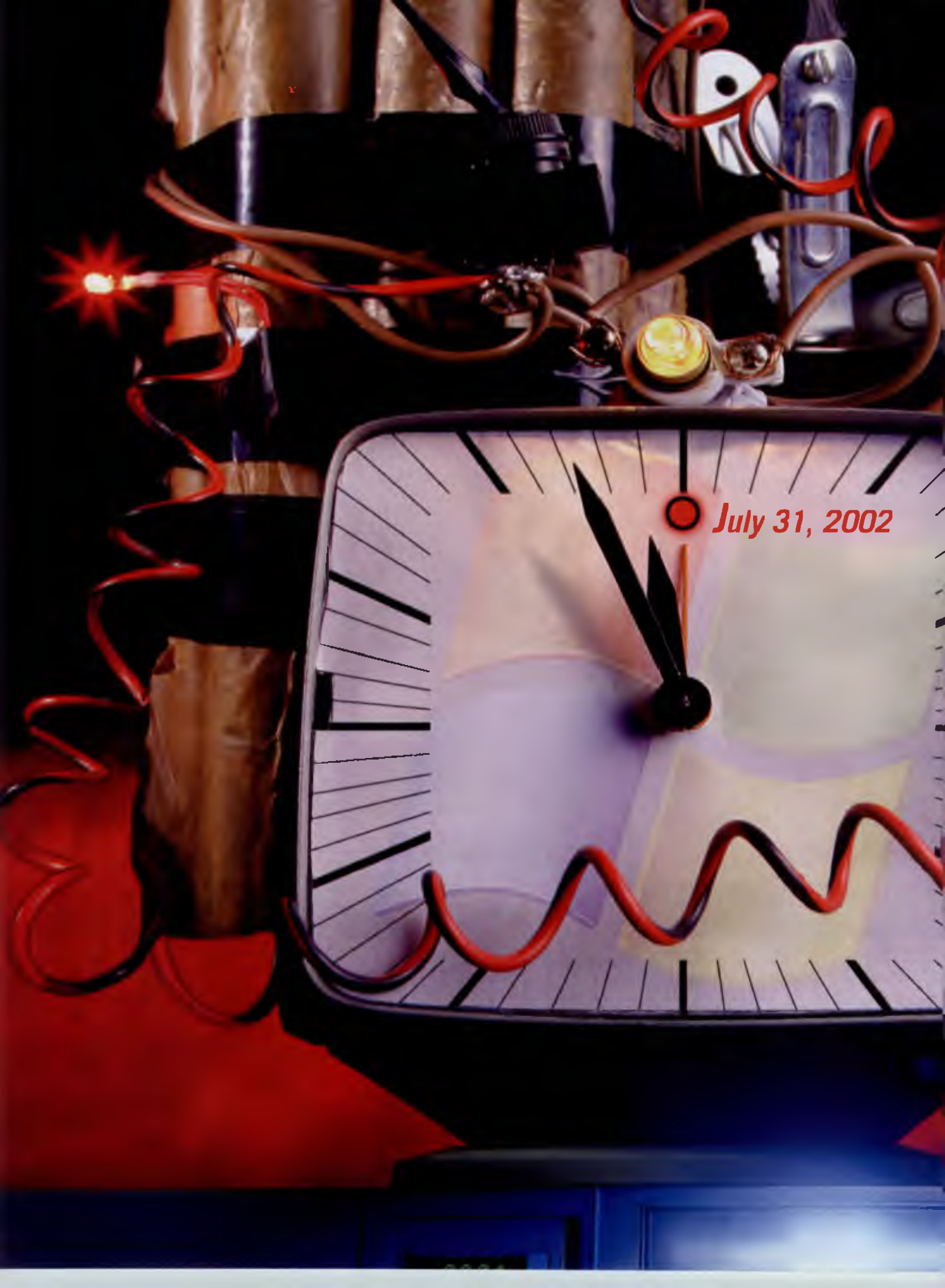
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July 31, 2002

THE FINAL COUNTDOWN

YOU SURVIVED Y2K, BUT NOW THERE'S A NEW HIGH-TECH HEADACHE AROUND THE CORNER. MICROSOFT'S NEW LICENSING SCHEME CHANGES NOT ONLY HOW YOU'LL PAY FOR SOFTWARE, BUT HOW MUCH YOU'LL PAY. AND YOU'VE GOT UNTIL JULY 31 TO SORT IT OUT. WILLIAM MAHER REPORTS.

Craig Horrocks is losing his cool. You can tell he's trying to keep his anger under control, but it's getting difficult. The partner at New Zealand legal firm Clendon Feeney has a headache, a technology headache, and it's getting worse.

The way companies pay for volume (bulk) licenses of Microsoft products like Windows and Office is changing, and the way Horrocks sees it, his IT costs could skyrocket by some \$25,000 per year. Horrocks likens it to being "put against the wall with a gun and being told 'give us your money or else.'" Not that you'll lose your life, but hey, those IT managers can be a touchy lot.

Around Australia and overseas it's the same story; companies racing to understand the changes before the July 31 deadline to renew their contracts under the new program. At stake are IT budgets worth millions, while Microsoft stands poised to reap the rewards.

It's not all bad. The new system makes life easier for companies wrestling with complicated upgrade contracts and budgets, plus it's easier to plan software budgets. It's all part of Microsoft's effort to prepare the way for its vision of delivering software upgrades as a service, just like electricity or your ham and pineapple pizza. It's quick'n easy upgrades, tailored for you — a tantalising promise in these days of overstretched IT budgets.

The catch is an annual fee; it's not compulsory, but some argue they don't have much of an alternative. After July 31, Microsoft removes discount prices for one-time bulk upgrades. If you're not paying the annual fees, then you fork out big bucks for full price upgrades.

116

Here's the catch

Options for your business and the tips and traps of the new licensing fees.



120

Life without Microsoft

Is Linux the answer?



The changes have touched a raw nerve in the data centres and boardrooms across Australia. These places aren't usually hotbeds of excitement, but lately you'd be forgiven for thinking you'd stumbled onto the set of a soap opera. There are fiery conflicts, troublemakers, backstabbing, bitter endings to old relationships, and a looming make-or-break decision with big fortunes on the line.

On the surface many folk are tight-lipped about the issue, especially those people sweating over million dollar contracts. A quick ring-around to IT managers gets a polite but firm series of palm-offs. "It's a political thing," apologises a network administrator after instructions not to talk came from higher up the corporate ladder.

The IT manager at one prominent Australian company did agree to talk anonymously, but the interview was cancelled at the last minute. Phone calls weren't returned. The brick wall of silence had gone up.

IDC ANALYST NATASHA DAVID SAYS THERE ARE "PLENTY OF PEOPLE MIFFED" ABOUT THE NEW DEAL

That's not to say there is no-one with problems. Some companies are rebelling publicly, and people like Craig Horrocks are making a big noise about it. He's filed an official complaint to New Zealand's Commerce Commission and managed to stir up a media frenzy. He's been quoted by *USA Today*, bailed up by photo-hungry press photographers at an airport while boarding a plane, and been interviewed for television.

Life's a rollercoaster when you're ruffling the feathers of Microsoft, the company with quarterly revenue of \$US7.25 billion (\$A12.93bn) and software on nearly every desktop PC in every office around the world.

But since he began drumming up media interest, Horrocks has found an IT world seething with questions and complaints about Microsoft's licensing policy. Messages of support have been flooding in from as far away as Switzerland and Africa, and people have written privately from places such as the Australian Federal Government and major IT companies. "I haven't actually had one [correspondence] that has been positive [about Microsoft] yet," he says.

In Australia, there are no solid figures on who's rebelling against the new licensing plan. Local analysts at Gartner say they have had "a lot of enquiries" from concerned Microsoft customers, while IDC analyst Natasha David says

	UPGRADING FROM	BEFORE JULY 31, 2002	AFTER JULY 31, 2002
YOU WANT SOFTWARE ASSURANCE Suits those who mostly upgrade within every 3.5 years.	Office 2000	Purchase Software Assurance. You get all upgrades for next few years of contract (usually three years). \$843	You must purchase a new licence and Software Assurance. \$1809
	Office 97	Buy special upgrade to get current version, then purchase Software Assurance. You get all upgrades for remaining contract period (two years). \$603	You must purchase a new licence and Software Assurance. \$1809.
YOU DON'T WANT SOFTWARE ASSURANCE For those who wait longer than 3.5 years before upgrading	Office 2000	Do nothing now. Purchase full licence next time you upgrade. \$968	Purchase full licence next time you upgrade. \$968
	Office 97	Purchase full licence next time you upgrade. \$968	Purchase full licence next time you upgrade. \$968

Tips and traps:

1. After July 31, companies can no longer pay for discounted, one-time version upgrades. This means if you're not paying annual maintenance fees under Software Assurance you'll have to buy a completely new licence to upgrade.
2. Software Assurance is calculated at 29% of the cost of a licence for desktop products (Office, Windows, Project, Visio) and 25% for server products.
3. Only "current" software can be switched over to Software Assurance before the July 31 deadline. This means you must be on Windows 2000/XP or Office 2000/XP to sign up.

Here's the catch:
 So how much more will companies pay under Microsoft's new scheme compared to the old program? Gartner estimates that the 60% of enterprises that wait for 4 years or more to upgrade will pay 68% to 107% more. The 25% of enterprises that upgrade on average every 3.5 years or more will pay 35% to 77% more under the new scheme. Note that these figures are just a guide; costs depending on licence volume and exact details of licence agreement.

Also, note that the licensing program for the consumer/retail market stays the same. The changes relate to Volume Licensing. For more information visit www.microsoft.com/licensing.

Note: Table lists entry-level pricing under the Select A 6.0 license.

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Craig Horrocks: leading the public fight against Microsoft's new licensing arrangements.

there are "plenty of people miffed" about the new deal. Overseas, a survey of 4,550 people by Giga and Sunbelt Software found that 80% expected to pay more for software like Office and Windows under the new scheme.

CRUNCHING THE NUMBERS

Despite all the grandstanding Horrocks describes himself as a longtime loyal Microsoft customer. Microsoft had even written case studies about his New Zealand company, but the relationship began to sour after the new licensing plans were announced in 2001.

The trouble began when Horrocks tried crunching the numbers. With 25 PCs running Office and Windows, plus servers and other applications, he figures he pays about \$NZ12,000 (\$A10,200) a year for Microsoft software. This would soar to \$NZ42,000 (\$A35,700) under Microsoft's new program.

Nor does the new scheme include the right to one-time discounts for software upgrades. Instead, companies pay full price, like buying a new car each time they want an engine overhaul.

The alternative is to pay a maintenance

fee — a security blanket if you like — which entitles companies to the latest upgrades as they're released. Microsoft calls this program Software Assurance.

Whichever way Horrocks looks at it, he stands to lose. Microsoft has suggested he upgrade by trading up to new PCs with new software pre-installed. But then he'd end up with a mix of Windows 98, 2000 and XP machines, something Horrocks describes as a "complete mess".

Or, he could do nothing and wait a few years till he needs to upgrade the software, but then he'll be up for the full licence price.

"The SME is being forced into a model where they can't choose any option. They've got to somehow battle their way through all this nonsense, and they're paying more and getting less, and not getting any service," Horrocks says.

A worst case scenario would have to be the Sydney offices of Greenpeace. Picture it: 90 PCs, the oldest as slow as Pentium 233MHz with 64MB of RAM, some still on Windows 95 and Office 97. Greenpeace IT staffer Geoff

for upgrade rights might not be appropriate during that time.

SOFTWARE FOR RENT

As the July 31 deadline to switch to Software Assurance draws near, the person with the unenviable task of weathering the storm of confusion, misinformation and protest is Microsoft's licensing chief Robert Vogler.

"There has been some angst that the customers feel that they *must* get onto this new program today. No. But we do recommend customers look at what their long-term outlook is," Vogler says.

What about the little guys, the ones not already operating on the latest Microsoft technology? "There will be some customers that will find it more expensive. I can't shy away from that," Vogler admits.

Nevertheless, he argues that the one-time discount prices these people want haven't been popular. Of all the total volume licenses sold by Microsoft over the last four years in Australia —

"THE MAJORITY" OF MICROSOFT'S BUSINESS CUSTOMERS ARE MOVING TO MAINTENANCE LICENSING

Nimmo estimates as many as 70% of the machines wouldn't cope with upgrading to NT. Yet this is not an unusual picture in the business world.

With Software Assurance, Greenpeace has the opportunity to "get current" and "stay current." But the initial outlay can be prohibitive.

Nimmo believes he'd be up for somewhere between \$200,000 and \$500,000 over the next 12 months, taking into account the cost of new hardware and training.

"We can't see why we'd want to get on this upgrade rollercoaster. If we're using Pentium 233s we're fairly behind the upgrade path. We object to being forced to upgrade, simply because this company has decided it's time to refill the coffers," he complains.

"The reality is that a lot of enterprises will seriously consider how frequently they do desktop upgrades from now on," says Gartner analyst Greta James. This includes companies like St George Bank, which reportedly rolled out Windows 2000 across 8,000 desktops last year; reports say the bank didn't expect to upgrade for three years, so paying maintenance

more than six million licenses — only 6% were one-time upgrade licenses.

"We've found customers were confused with those choices. In fact they got themselves non-compliant by the confusion caused by those one-time upgrades," Vogler says.

Vogler also points out maintenance fees are nothing new for other software vendors. Lotus charges them, as do Computer Associates and Oracle. "The majority" of Microsoft's business customers are moving to maintenance licensing he says. Down the track, these companies might benefit from the simplicity of just paying Software Assurance.

There's also another new option — subscription rental. Instead of buying the licence, you pay annual rental and at the end of the three-year contract you either renew the term or return the software. It's another part of Microsoft's grand plans — the vision of "software as a service"

"The old model which we've been using for the last 40 years... takes a long time for new features to get to market. What we're doing with software as a service is effectively looking at releasing updates to parts of the

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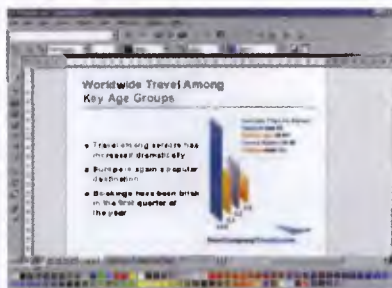
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product without having to wait for all of those enhancements to be put together in one big upgrade version," Vogler explains.

For example, in the future Microsoft might release updates to Word as soon as they're ready, rather than waiting until new versions of other Office components are finished. All you have to do is click, drag and presto, you've upgraded to the latest version. It's business technology delivered fast-food style.

There's hope that under this model customers can avoid paying for "bloatware," the tag given to Microsoft software filled with features no-one uses. "The control is definitely in the IT departments' hands and no, basically we are not going to push things down and force people to use stuff that they're not ready for. If anything, it'll be far more flexible for them," Vogler enthuses.

In the meantime, the July 31 deadline is causing many businesses to rethink their approach to paying for software. Neither Craig Horrocks at Clendon Feeney, or Geoff Nimmo at Greenpeace will sign up for Software Assurance. It's the same story over at small Sydney company Aspect Financial.

Aspect's manager Andrew Bird explains: "Even if it's a good deal, we wouldn't be

"...THERE'S A LOT OF RISK TO UPGRADING, PLUS YOU'RE NOT GOING TO BE GETTING MUCH NEW ANYWAY."

interested in XP because it's too much effort. For a lot of business users there's a lot of risk to upgrading, plus you're not going to be getting much new anyway."

One alternative is Linux (see story below). Bird is experimenting with the cheap-as-chips operating system, and so is Craig Horrocks over in New Zealand. But the Penguin is not the magic solution it's sometimes made out to be.

Horrocks figures that with training and setup time, migrating his operation over to Linux will take three years and estimates the cost at about \$NZ10,000 (\$A8500) per user. He also has a database of thousands of legal documents, all in Microsoft format. Converting them to Linux would be a logistical nightmare, so he'll have to hang on to some form of Windows to maintain a semblance of compatibility.

Commonplace issues like this facing every business contemplating a shift away from a Windows-based platform mean that for the most part, Microsoft's new licensing plan will win

out despite the protests of many SMEs. In the meantime, thousands of companies like Clendon Feeney will be forced to stick with Windows on the desktop or server. It's great news for Microsoft's bottom line, with a steady stream of income as customers take to the upgrade track.

Eventually, changes like this will be necessary as Sun, Microsoft and others reshape software around the Internet. For the meantime though, things aren't going to get any easier for the companies who can't afford to properly get on board Software Assurance. In three years time, Horrocks predicts he'll probably have a dual-boot system, with Linux and increasingly ageing versions of Windows chugging along side-by-side, with the attendant incompatibility issues between two totally different OSes.

"If anyone thinks they don't have high switching costs [from Windows to Linux], they're putting themselves on. Right at the moment switching costs are absolute. You just can't do it." ■

LIFE WITHOUT MICROSOFT?

Thinking of ditching Windows software for something cheaper? It's easier said than done. Linux is budget-priced, but you'll need to do some background work if you want enough solid, reliable applications to run a business.

There's good news on the office front because Sun's cut-price alternative to Microsoft Office, called StarOffice, has just been revamped. At \$209 the new version, StarOffice 6.0, is a steal and it has crucial support for the Microsoft Word document format. You also get a spreadsheet and PowerPoint-style presentations, and the software shouldn't be as taxing on your PC.

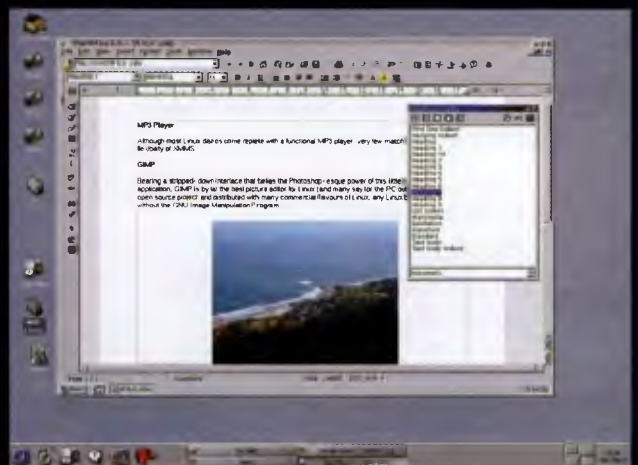
The bad news is that there are still mixed reports about StarOffice, even with the recent revamp. Craig Horrocks has been testing StarOffice and argued it is still missing too many useful features. He also reported that complex Word documents crashed the software.

Even Linux promoters like Con Zymaris of Cybersource admit there are difficulties

persuading businesses to look at Linux. He said there's a high potential for senior embarrassment. "It's one of those stampede situations. Nobody really wants to move first and be one of those new kids on the block," Zymaris says.

Still, Linux distributor Anthony Rumble from EverythingLinux says there are major companies doing some serious research into Linux, like one major Australian bank, but they're just staying quiet about it.

"If you can convince someone they can be pushing savings in the order of \$1 million to \$2 million, to \$3 million, then that's something they can't ignore," Rumble says.

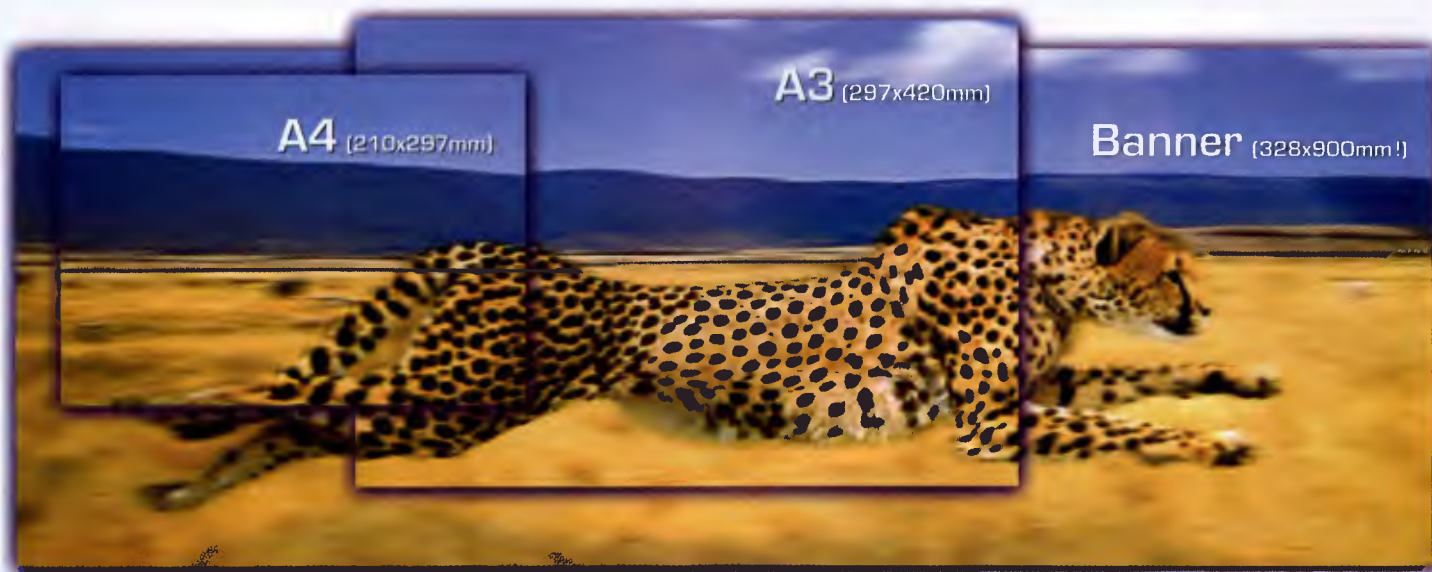


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The Colour of Business

Influential figures in the IT industry agree that modest beginnings are useful. Philippa Yelland discovers several success stories and finds that the humble helpdesk can be an ideal career launchpad.

From ground floor

Ask any of the top suits in the IT industry, and they'll tell you that helpdesks, tech support and call centre positions are great launching pads into IT careers, both locally and internationally.

Paul Roworth (pictured right), Microsoft's product marketing manager for Windows XP, joined telephone pre-sales support 10 years ago before moving to the MS helpdesk. From there he was promoted to systems engineering as a pre-sales tech evangelist, business development manager, and then into his current role.

Was the helpdesk a good starting point? "Absolutely," enthuses Roworth. "It exposes you to the technology that underpins the IT industry. The interaction with customers gives you skills such as active listening, tech skills and general confidence that place you in good stead for positions beyond the helpdesk."

Adam Laurie, 22, was working as a labourer when he heard about a job at ING (Internet Name Group) in January last year. With no formal qualifications or industry experience, he began as an office assistant, and soon progressed to the helpdesk.

"Each time I helped a customer my knowledge increased, giving me a broader awareness of IT issues," Laurie says. More inhouse training in product knowledge and customer service has moved him up the ranks to his current job in sales as area supervisor.

ING's director Sasha Sudakov believes this grass-roots approach is paying off. "By allowing our staff to grow with the company, we're retaining knowledge which is then put back into the business. It's an important investment."

While the consensus is that helpdesk is a good entry point, it's important to understand what you're getting into. "Helpdesk jobs are very different to tech support roles," warns Geoff South, Rational Software's tech support head. "Many of our tech support team members consider their jobs as a destination rather than a journey — they hold PhDs in various fields of engineering and help clients solve complex issues, using Rational's software development tools. A very good career can be built around tech support, as it's more than just trouble-shooting."

Contrary to popular opinion, a lack of formal technical qualifications isn't a barrier to entry. Personal attributes are fundamental, adds South. "We look for three key areas when hiring: first, motivation, attitude and personality; second, skills; and third, education and experience. The first is the most important — these attributes are inherent in a person and cannot be taught."

PROFILE JEFF ALEXANDER



Microsoft's helpdesk was an unlikely springboard for Jeff Alexander's current job as regional data centre manager, but he says it gave him crucial technical and customer service skills.

Alexander (above) has been with the company for a hefty 14 years, starting his career at Microsoft as an accountant. So how did he get from number cruncher to tech guru? "Kind of the long way around, I guess," he admits.

Alexander completed a business administration degree at Holyoke Community College in Massachusetts, USA, with majors in accounting. He then joined Microsoft in 1987 in accounts payable. "I did that for two years, but it wasn't really me," Alexander says.

He then moved into the customer services department, where for three years he answered up to 100 calls a day, helping customers and prospective customers with inquiries regarding Microsoft products. This gave him skills in marketing, pre-sales, technical questions, and customer service.

"I liked the customer interaction, but found myself really enjoying the technical

'help desk' aspects of it, actually working with the technology," he recalls.

As a result, he sought a more technology-focused role within Microsoft, moving into product support, then into the company's internal technology group, and from there to the role of technology specialist.

"It's not so far from number cruncher to tech guru after all," he jokes. "When I worked on the helpdesk, it improved my customer service skills a great deal by having to deal with internal customers."

In his new position as the regional data centre manager, Alexander is responsible for IT services across Microsoft's South Pacific network. The centre provides network

services to Microsoft offices across Australia, New Zealand and some sites in India. Geographically, it's a large area, and technologically it's a big job.

The data centre in North Ryde, Microsoft Australia's new home, has over 100 Windows 2000 servers. It's been designed specifically to allow customers and partners to see how Microsoft manages its IT infrastructure.

"It's an exciting role to be in," Alexander says. "As the manager, I have an internal, technical, operations role, and a customer-facing role — giving presentations and showcasing our technology to customers. It combines all the things I liked about my other roles. It's the best of both worlds!"

to the top IT jobs

University graduates — both IT and non-IT — are finding helpdesks a useful start to their careers. "The helpdesk provides not only technical skills training, but also valuable learning opportunities in customer relationship management and problem resolution," says Ian Moore, human resources director at Getronics Australia.

Performance on the helpdesk is a critical issue because customer relationships and problem resolution are the keys to success, Moore adds. Each call centre staff member has career objectives set and reviewed at quarterly update meetings.

The ideal starting point is a smaller company, such as a software distributor, that's prepared to invest in time and resources in training. "You're not competing with hundreds of other staff for internal positions or resources," says Clayton Lee, founder of network administration specialist company ArrowTech.

Lee knows from hard experience about using helpdesk jobs as launching pads — he was retrenched three times before he was 25-years-old. After completing two years of computing at Macquarie University, Lee worked as a manager at McDonald's where he found the customer service training useful for his next job on the helpdesk at now-defunct software distributor, Hot Key. While at Hot Key, he took over handling the network while studying for his MCSE (Microsoft Certified Systems Engineer). "This was my introduction to network admin, and another benefit was that it fast-tracked my career so I didn't need to complete a degree."

From Hot Key, Lee moved to network admin with e-ventures before redundancy hit again early last year — the impetus to start his own company, ArrowTech.

Soft skills, such as the ability to handle irate customers, are fundamental and almost more important than technical brilliance. "You're often dealing with multiple tasks, solving problems for people who may not be technically minded, and dealing with customers who may be frustrated and demanding," says Felicity Pietersz, founder and director of e-BI Solutions. Pietersz should know — she completed an IT degree and then joined the Australian Army as a lieutenant, working on Training Command's helpdesk and later managing it.

One of the most important personal qualities is empathy — the ability to listen to people's technical issues and then working through them. Combine this with a can-do attitude, and you have a winning recipe for helpdesk success.

"Perseverance and patience are required when resolving technical issues," says Getronics' Moore. "Stress management is essential, since helpdesk staff are often dealing with irate people and they need to manage this negative energy without impacting their job."

Putting its money where its rhetoric is, Getronics sends all staff on its internal Customer First Program training course. This 8-week program puts five people in a team — particularly useful since the helpdesk is largely based on teamwork. The modules cover topics such as listening skills, effective report writing, brainstorming, presentation skills, and problem analysis and resolution.

The consensus among IT people who've started out as helpdesk staff is that it's possibly the best way to enter the industry. Cassandra Singh, business unit manager at outsourcing call centre Datacom, attributes her current success to starting on the company's helpdesk eight years ago — she's now responsible for 45 staff over three departments, handles major account relationships, and has a stake in the company's future.

"When I started, I wasn't sure of the exact path I wanted to take. From helpdesk, I moved into networking — only to realise that I wanted to continue my career in management." ■



DESIRABLE SKILLS

HARD SKILLS

- Sun Java
- IBM WebSphere
- Microsoft .NET
- TAFE Certificate in IT levels I-IV
- TAFE Certificate in Telecommunications (Call Centre) levels I-IV
- A+ Certification from CompTia
- Net Plus Certification from CompTia
- MCSE (Microsoft Certified Systems Engineer)

"Formal tertiary qualifications are good in the long term. Practical IT courses such as MCP (Microsoft Certified Professional) are even more important as it's the practical element that really counts when working in a support role."

— **Paul Roworth (above)**, Microsoft product marketing manager, Windows XP.

SOFT SKILLS

- Motivation
- Presentation skills
- Communication abilities
- Active listening
- Analytical mind
- Written communication
- Customer-focused personality
- Stress management skills
- Report writing
- Thinking outside the square
- Good typing speed

"The soft skills we look for when sourcing candidates for helpdesk and contact centre positions include good communication and problem solving skills, flexibility, patience, enthusiasm, and basic customer service skills. Good communication doesn't necessarily imply we recruit agents with the gift of the gab — but those who have the ability to actively listen."

— **Paul Smith**, managing director, Telus

Boss Talk

With lots of talk and little action, Darren Horrigan gains few insights into some of the world's most influential business leaders' ideas.

You know those movies that have so many stars in them you have to buy a ticket but you leave the cinema thinking you've just watched three hours of big names talking on film and little else? Welcome to Boss Talk, the book, a stellar cast of the world's biggest business names: 170 pages of bosses sounding like bosses — but nary a real insight amongst them.

Here you'll find the various thoughts of 21 CEOs on subjects such as motivation, business growth, the "new" economy, building a brand, and instituting change. Presented as a series of Q&As with various editors from the *Wall Street Journal*, the frustration is what they don't ask. Too many Dorothy Dix questions result in too many feel-good statements masquerading as ideas for business success.

The headliner on this bill and the undisputed world champ of CEOs is Jack Welch, the man who took General Electric

from a market capitalisation of \$13 billion to \$500 billion in 20 years. Here's Jack's philosophy on motivating employees: "You have to get rewarded in the soul and in the wallet. The money isn't enough, but a plaque isn't enough either."

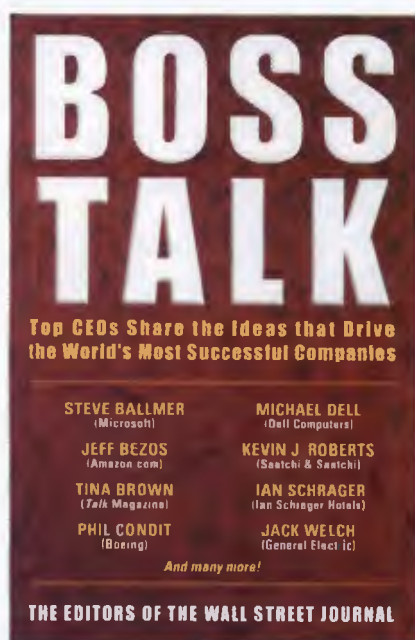
Stephen R. Hardis, the chairman of Eaton Corp, a company that manufactures truck axles, tells of once hearing a dotcom executive speak on radio: "He had a creative idea. We have to sell this stuff for more than it costs. Isn't that terrific?"

Jergen Schrempp, the chairman and CEO of Daimler Chrysler talks of the "digital decisions" that must be made during company mergers — those uncompromising yes/no determinations that a computer might make. He says: "Human beings don't like digital decisions. They like compromises."

You also get Michael Dell waxing lyrical about his company's direct-selling model; Cisco boss John Chambers, on managing growth; John Roth, the president and CEO of Nortel on what the new economy can teach the old economy, which we already know is bugger all; and Microsoft CEO, Steve Ballmer, who spends seven pages saying absolutely nothing. But he says it with such eloquence.

It all makes this collection a handy introductory text for students enrolled in Business 101, but a waste of time for potential MBAs or anyone looking for clues into how these people operate. For that, you'll have to buy their autobiographies. Perhaps some day we'll get a book about what the world's top CEOs really think. No, I mean what they *really* think. Now that would be worth reading.

Publisher Allen & Unwin
Price \$24.95
ISBN 1865087505



Plenty of hot air, but few real insights.

ELECTRONIC BANKING: THE ULTIMATE GUIDE TO BUSINESS AND TECHNOLOGY OF ONLINE BANKING

Even though it's compact at just over 200 pages, this is an introduction to the subject, a collection of practical case studies, a reference source on the intricacies of security, a useful crib for those needing a crash course, and ultimately, a bloody good read.

Publisher Vieweg

Price \$117.15

ISBN 3528057548



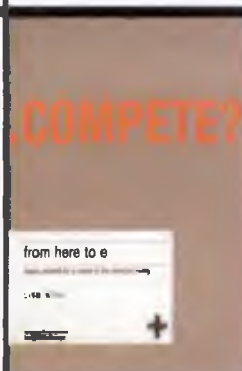
.COMPETE? FROM HERE TO E: EQUIP YOURSELF FOR A CAREER IN THE WIRED ECONOMY

Designed as a practical guide for those who want to equip themselves with the savvy skills and occasional bullshit necessary for a career in the "new" economy, don't forget there is far less of the latter needed now than when many of the dot com veterans quoted here started in the business.

Publisher Pearson Education

Price \$39.95

ISBN 1843040085



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Publisher Pearson Education

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Training Day

Good cop, bad cop, and the mean streets of Los Angeles. Been done before? Matt Overington finds few surprises, despite a stellar starring cast and some funky cameo appearances.

After working the harsh streets of L.A. for 13 years, detective Alonzo Harris (Denzel Washington) has blurred the lines between right and wrong. When rookie cop Jake Hoyt (Ethan Hawke) is assigned to him for the day, Harris sets about getting Hoyt to join his group of corrupt officers — by setting him up. 2001 Academy Award-winning Denzel Washington, and Best Supporting Actor nominee Ethan Hawke, play convincing roles in this good cop versus bad cop movie.

AUDIO

The movie is presented in Dolby Digital 5.1 surround sound, and the audio track is high-quality. A number of gun fights break out during the course of the movie that make good use of the surround sound — most notably when Hoyt and Harris engage in a shootout in the streets of a gang neighbourhood.

VIDEO

Despite the fact that most of the film is set during daylight hours, the film is extremely dark and it makes good use of light — particularly in indoor scenes like the house of a major cocaine dealer. The film is presented in 2.35:1 widescreen format, and cameo appearances from Dr.Dre, Macy Gray, and a wheelchair-bound Snoop Doggy Dogg set a realistic gangster theme.

EXTRAS

There are a number of extra features, the standout being an alternate ending that picks up near the end of the feature, plus ten minutes of extra scenes added throughout the movie.



You mean honest cops can't afford bling bling?

There is also a commentary track over the top of the movie featuring the director, Antoine Fuqua, discussing "going undercover" — talking to people living in L.A. about how the police force is regarded by the public.

This complements the "Making Of" documentary, which has commentary from Hawke, Washington and Fuqua outlining the film's production.

Music videos bundled on the DVD include #1 by Nelly, and Got You by Pharoahe Monch.

Regardless of the slew of special features and the cast, Training Day is just another cops and robbers movie with fewer twists than you'd expect from its pedigree and hype.

Price \$39.95

Zoolander

Zoolander is a DVD nut's delight. Along with commentary from its creator and star, Ben Stiller, and writers Drake Sather and John Hamburg, it struts out heaps of extras, including deleted and extended scenes, hilarious outtakes and photo galleries.

Price \$39.95



Doctor Who: The Ark in Space

Doctor Who (Tom Baker) arrives on space station Nerva to find its inhabitants on the menu of a hungry race of space-dwelling insects. TARDIS-shaking special features include cast commentaries, the original 1975 trailer and modelling sequences.

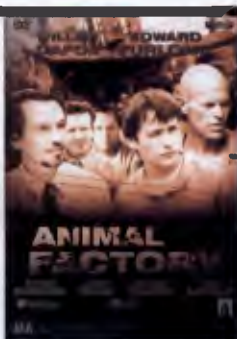
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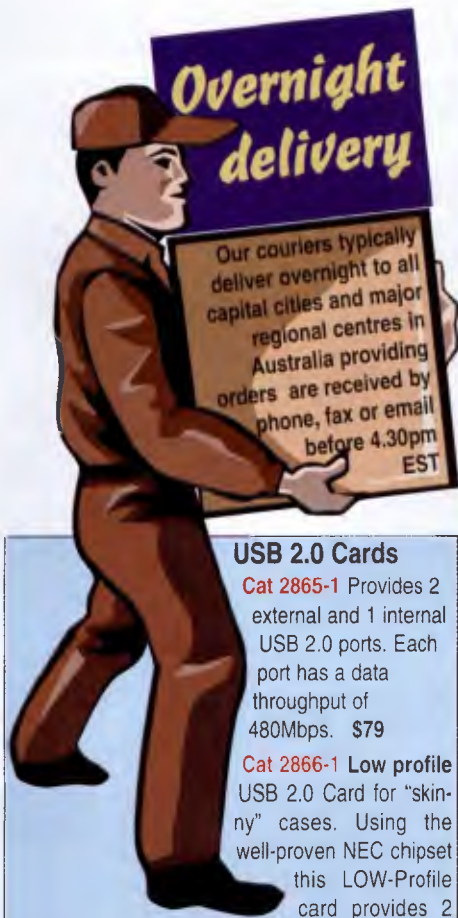


Animal Factory

Sentenced to 10 years in prison, Ron Decker (Edward Furlong) seeks the protection of fellow inmate and lifer, Earl Copen (Willem Dafoe). But at what cost? The only special feature on this DVD is the trailer, however, Animal Factory is a harrowing look at life behind bars.

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Dungeon Siege

Microsoft's much-hyped hack 'n slash is finally here to party.

By Jason Hill

Dungeon Siege contains all the usual cliches of role playing games, but offers newcomers to the genre a chance to instantly enjoy themselves. It's an action RPG in the Diablo mould, but with a team that can assist your main character as you progress through the adventure. The game is accessible, fast-paced, stunning to watch and sadly, a little too shallow.

You start off as a simple farmer who must rise up against an Evil threatening to consume the land. Your quests usually involve simply getting from point A to B, and maiming and pillaging anything that moves along the way. The generic, medieval plot simply serves as an excuse to keep pushing you along the journey.

Characters are developed as they gather experience, and it's your choice as to whether they specialise in magic, melee, or ranged weapons. The more you use particular skills, the quicker they develop.

You'll also acquire strength, dexterity and intelligence, which are necessary for using more powerful weapons, spells and armour. It's a flexible yet simple character development system that suits the game perfectly.

Up to eight members can join your party and your characters show intelligence,

defending one another when necessary. However, players would expect that the introduction of a team and battle formations would add more strategy to combat, comparable to that of Diablo.

Unfortunately, no matter how hard you try to inject tactics into battle, combat always turns into a brawl hardly requiring player involvement. The enemy AI, which usually just involves your opponents rushing at you and hacking away, is similarly basic. Combat is still loads of fun, but more depth would extend the game's life span.

Fortunately, the game is so enjoyable that there isn't much time to complain about its limitations. There are loads of items to collect, and it's great fun experimenting with spells and trying to equip your party with the coolest gear. And while the action is linear, the game is gorgeous to watch and there's always a new enemy and an intense and exciting battle around the corner.

You'll be spellbound as you travel through dense forests, snowy mountains, eerie swamps, arid deserts and atmospheric underground caverns. Thanks to a lack of loading screens, the world is totally immersive and the changes in terrain are amazing. The detail in the characters and monsters is equally impressive. Campaigns can be played co-operatively with other humans, and there's also a dedicated multiplayer map with plenty of options. Unfortunately, you can only play one character in multiplayer games, so it is



► *This hot Dungeon babe can get really fired up, so don't cross her.*

more restrictive than single-player.

Dungeon Siege promises a lot, but just falls short as a must-buy. Having said that, it's a polished, addictive and entertaining romp through a stunning game world, but players looking for depth might be disappointed.

Online www.microsoft.com/games/dungeonsiege

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Heroes of Might and Magic IV

The turn-based Heroes series has slowly built up a strong and loyal following for over five years, but this fourth edition is the first real sequel. Some significant changes have been made and a new engine makes the game even more enjoyable. Whether you are new to the series or a dedicated fan, you'll soon be addicted.

You create a hero, raise an army of troops in your town, and then venture out to conquer your enemies. For the first time in this series your hero personally fights in combat, which makes the cultivation of heroes a bigger importance to the game. The game has 11 hero classes to initially select from and a large

variety of skills to develop without being too overwhelming.

The game has more depth than ever before, with over 60 creatures, five schools of magic and six town types. The enemy AI is sharp and the game is wonderfully balanced.

With six great campaigns to churn through and the ability to make maps and quests for your friends, strategy fans will be glued to the screen for weeks.

Online

www.3do.com/mightandmagic/heroes4

Price \$89.95



► Get high on the hero factor.

The Sims: Vacation

The highest-selling computer game of all time continues to dominate the charts, and EA are milking it for all its worth with their fourth expansion pack. Fortunately, The Sims: Vacation offers plenty of features and a lot of fun.

Your Sims are just a phone call away from relaxation. Whether it's a tropical getaway, extreme holiday, or a romantic weekend in the great outdoors, your little computer people will love getting away from it all. Just beware the kids don't get kicked off the island for rowdy behaviour!

There are loads of new items so your Sims can build Snowmen, perform tricks on the snowboard half-pipe, build sand castles on the

beach, go fishing and even send postcards to their friends about what a wonderful time they're having. Some of the items, like the carnival games, don't really offer anything new except a cosmetic change, but others, like volleyball, are fascinating to watch.

Vacation is not as innovative as Hot Date, with its many new social interactions, but there is plenty for fans to tinker with and it's great to get your Sims out of the house. You might even get a souvenir to take home.

Online thesims.ea.com

Price \$44.95



► Awww, aren't they cute?

Warlords Battlecry II

Long-time Aussie developer SSG has delivered a real-time strategy game that blends role-playing elements by allowing you to develop a hero who accumulates experience points with every battle. Sadly, the game is not innovative enough — it feels more like an expansion pack than a sequel. However, there are improvements and this sequel this is recommended to newcomers.

The biggest change however is that the campaign mode has no story, it's more like a series of skirmishes throughout Etheria. You duel, beat off invasions, capture territory, and use your cash to purchase magical artifacts. Beginning with only one

territory and home city, you choose your own destiny as you march across a map.

There are 12 different and well-balanced races each with their own technology, buildings and units. Adding to the depth are over 100 special abilities and spells. Each side also has the ability to summon a Titan — a huge unit that can cause awesome damage. Throw in some good enemy AI and multiplayer modes and you have an excellent package, but one that's unlikely to challenge the upcoming Warcraft III.

Online www.warlordsbattlecry2.com

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Spider-Man

He does whatever a Spider can, and he's swinging onto a movie screen or games console near you. Fortunately, Spidey isn't the usual licensed rubbish that is churned out for the latest blockbuster — it's a very entertaining superhero romp.

The feeling of actually being Spider-Man is uncanny. The smart controls allow players to web-swing high above the huge city and climb any surface. You can have a good time just whizzing past the skyscrapers. And try free-falling 20 storeys, then spinning a life-saving web at the last second — it's superb fun. You can even battle enemies while flying.

As you progress through the game you can learn combo moves to spice up basic combat. Moves include backflip kicks, dive bombs, scissor kicks and web domes.

There are some exciting and well-designed levels, including web-swinging chases, stealth missions, and a brilliant section where you must decide whether to chase the Green Goblin or save innocent civilians. The game camera is occasionally dodgy, but it can't spoil this fabulous action game.

Online www.universeofheroes.com

Price \$99.95



► Spidey's hanging out all over the place.

MotoGP: Ultimate Racing Technology

XBOX

THQ's MotoGP is the best motorcycle title to be released in years, and leaves Namco's PS2 game in the dust. It not only looks stunning, but it is fast and innovative. The game does a superb job of simulating the speed, danger and excitement that two-wheeled racing offers.

Controls are tricky initially, but offer a lot of depth. MotoGP allows you to change your rider's position on the bike with the left analog stick. To complement leaning into corners, moving your rider backwards allows you to brake more sharply by increasing wind resistance. And as you head out of corners, crouching behind the windscreen

increases acceleration. Front and rear brakes are applied by using the triggers.

Thankfully, the fun factor hasn't been forgotten for the sake of realism. You can pull off powerslides, wheelies, and achieve blistering speeds on the straights. There are 10 official tracks, plenty of play modes, a wide choice of bikes and riders, realistic weather effects and many goodies to unlock. A must-buy for racing fans.

Online www.thq.com

Price \$99.95



► Last one over the line buys the bevvy!

Luigi's Mansion

GAMECUBE

The standout GameCube launch title isn't up to the standard of Super Mario 64, but it is typical Nintendo magic: simple enough for anyone to instantly enjoy, yet offering surprising depth.

With the aid of a torch and a vacuum cleaner, Luigi must search for his brother in a haunted house and suck up any phantoms he encounters, *Ghostbusters*-style. The GameCube's refined controller is perfectly suited to the job. One stick is used for pointing the torch (or vacuum cleaner), the other for moving Luigi. When players manage to stun a ghost with the light, they must quickly switch to the vacuum and begin a tug-of-war by rotating the stick like a fishing game.

Every room offers its own surprises, personality and ingenious puzzles. Luigi can also suck up fire, water or ice elements and use his vacuum in reverse. And there are plenty of hidden treasures and multiple endings to enjoy.

The game is a visual showcase for the new console. The ghostly lighting effects are marvelous, the cartoonish animation is cute, and although the locations are small, they are interactive and bursting with detail.

Online www.nintendo.com.au

Price \$99.95



► Luigi shows us where the sun really shines from.

WORKSHOP

Motherboard of the month

Gigabyte P4 Titan533
(GA-8IEXP)



Intel has made the first serious architectural shift in the Pentium 4 family with a move to a 533MHz FSB, writes David Lin.

Debuting at the end of 2000, with a minimum clock speed of 1.3GHz, the Pentium 4 attracted considerable criticism for the high cost of its implementation. The 850 chipset handling the Pentium 4 had the advantage of a 400MHz frontside bus (FSB), a great step forward from Intel's previous 133MHz FSB offering, but was also dependant on costly RAMBUS memory (RDRAM) instead of the cheaper and more widely accepted SDRAM and DDR SDRAM.

This created a reticence to the building and purchasing of Pentium 4 systems by OEMs and the buying public. Intel addressed this problem with the mid-2001 release of the 845 chipset — which integrates the Pentium 4 with the popular memory types and the 400MHz FSB.

With the introduction of the 845E chipset this May, Intel has released a chipset using DDR memory with a new FSB speed of 533MHz alongside a new sub-family of chips dubbed Northwood. According to the company, the 845E chipset's 400 and 533MHz system bus compatibility provides improved performance with support for the highest CPU frequency and increases system bandwidth for greater system responsiveness.

The chip speeds are initially offered at 2.26, 2.40 and 2.53GHz. As Intel already has a 2.40GHz Pentium 4 using the older 400MHz FSB architecture, the Northwood varieties are known as Pentium 4 2.40B GHz, the "B" moniker differentiating it from the older variety.

This month's motherboard is from Gigabyte and it's the company's top-of-the-range 845E board. Older CPUs will fit and work with this board, but only at the 400MHz FSB. Northwood CPUs dropped into the Socket 478 are identified and crank up to the higher 533MHz FSB speed.

The 845E chipset also natively supports USB 2.0, which supports all your USB 1.1 devices at 11Mb/s transfer rates and accommodates USB 2.0 devices at up to 480Mb/s. Gigabyte have also added some value on their own behalf. They have opted for IDE RAID and ATA/133 support using a Promise 20276 chip — the 845E chipset natively supports the slower ATA/100 standard. Three FireWire ports are also present, making the 8IEXP extremely flexible in handling storage and other peripheral devices.

Users will also be attracted to the embedded Creative CT5880 sound chip. Onboard sound usually pales against a dedicated sound card solution, but this implementation supports Dolby 5.1 surround sound which means

all you need to do is plug in your speakers for a potential home theatre.

Gigabyte provide six PCI slots, a CNR and AGP slot for expansion. Also, its customary Dual BIOS is implemented in this model. The software bundle was difficult to ascertain, as the board we received was a pre-release sample, but we understand the kit will include a full set of drivers and Gigabyte-specific utilities for tweaking performance and BIOS upgrades.

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Take your PowerPoint presentations online in style with Microsoft's free Producer. Joe Cassels shows how.



CT5880 sound chip

Motherboard integrated sound chips usually don't perform as well as dedicated cards, but this implementation offers the 5.1 Dolby Digital standard.

USB 2.0 ports

Two rear-mounted USB 2.0 ports are built-in as is the 10/100Mb Ethernet networking port.

IEEE1394

Three connectors for IEEE1394 (FireWire) save on buying an additional adaptor card. Cables and connectors are provided in the box.

ICH4 chip

In conjunction with the 845E chip, the ICH4 operates as the USB 2.0 host controller. It also handles the PCI bus, audio, LAN and ATA/100 functions.

USB 2.0 connectors

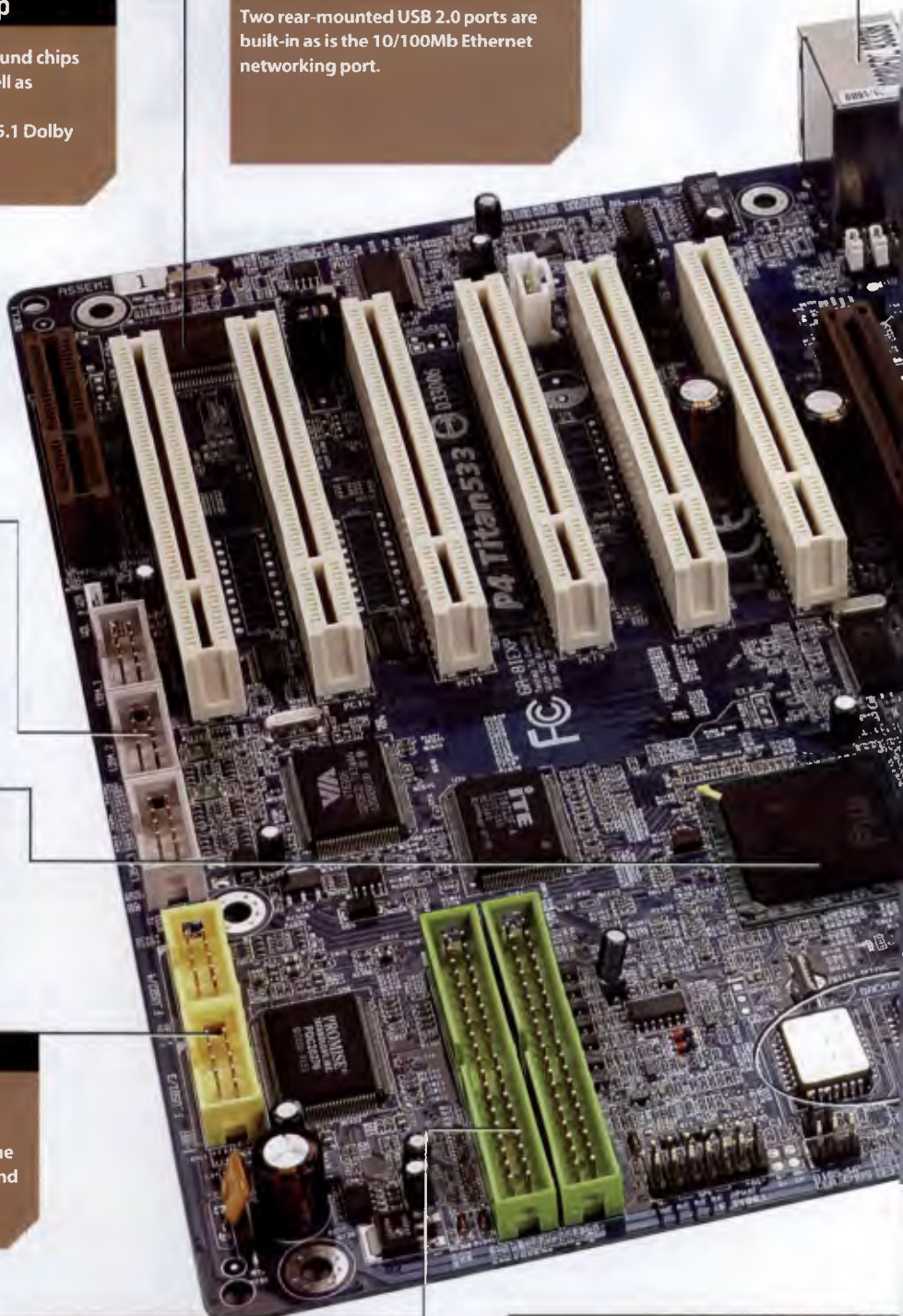
Front mounted ports have gained in popularity as more people use USB peripherals and find diving behind the PC to connect inconvenient. Cables and connectors are supplied.

IDE RAID

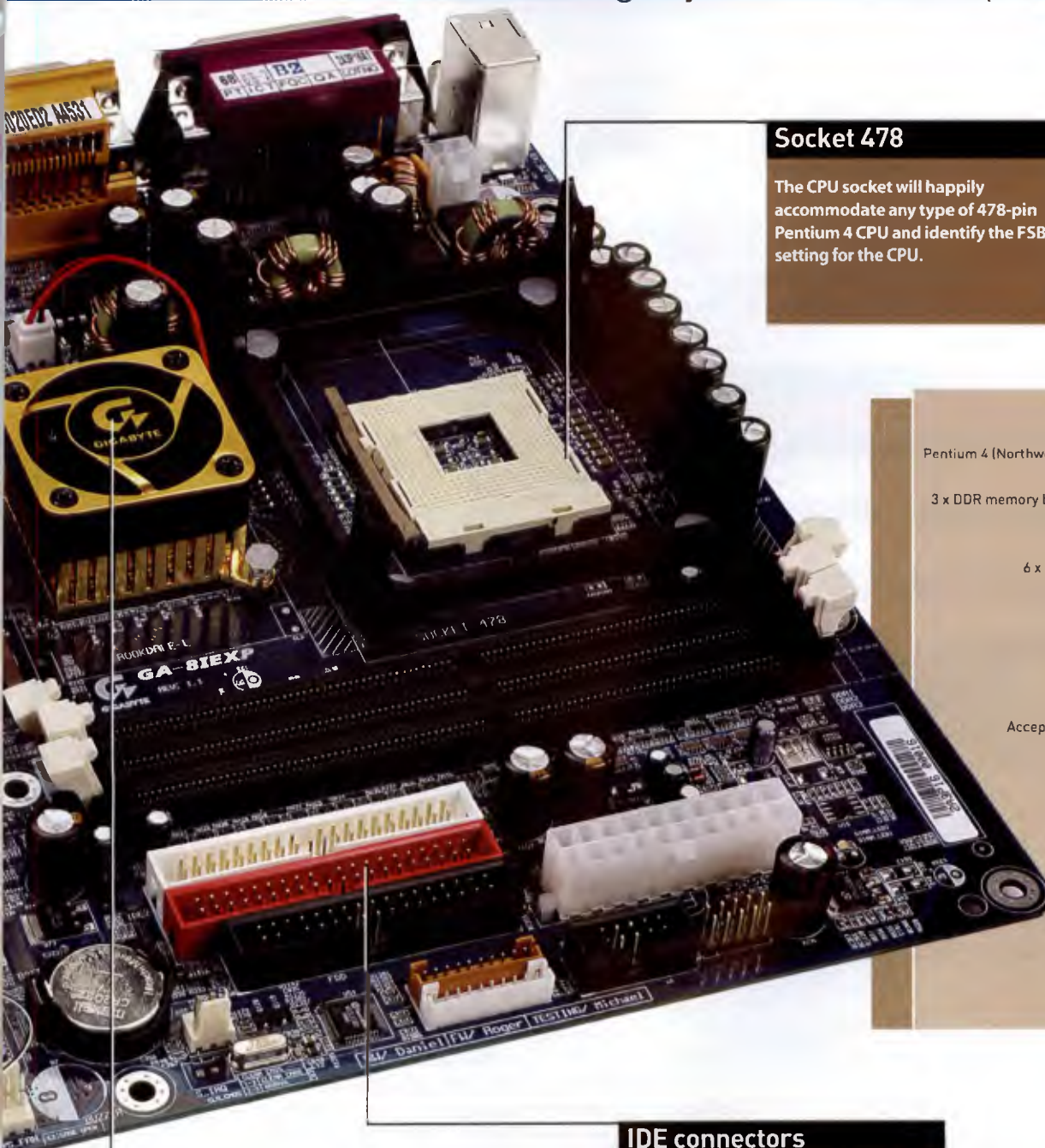
The two additional green IDE connectors, IDE 3 and IDE 4, are for implementing IDE RAID in conjunction with the other two IDE connectors.

Dual BIOS

Gigabyte have offered a dual BIOS configuration on their motherboards for a number of years. This thwarts virus attacks and corrupted BIOS — when the primary BIOS fails, the secondary automatically takes over.



Gigabyte P4 Titan533 (GA-8IEXP)



Socket 478

The CPU socket will happily accommodate any type of 478-pin Pentium 4 CPU and identify the FSB setting for the CPU.

Specifications

Pentium 4 (Northwood) Socket 478 motherboard
Intel 845E chipset
3 x DDR memory banks supporting a maximum
2GB PC2100 DDR DIMMs
400/533MHz FSB
6 x USB 2.0 ports (2 rear, 4 front)
3 x FireWire (IEEE1394) ports
Creative CT5880 sound chip
ATA/133 RAID support
Intel 10/100 Ethernet adaptor
PS/2 mouse and keyboard
1 x game/MIDI port
Accepts any mPGA478-pin package
6 x PCI slots
1 x AGP slot
1 x CNR slot
1 x Line-in port
1 x Line-out port
1 x Mic port

845E chip

The core logic chip that handles the AGP 4x, DDR200/266 memory and determines the 400 or 533MHz FSB speed.

IDE connectors

The standard storage connectors. Normally the 845E chipset offers the ATA/100 standard, but Gigabyte have implemented the Promise PDC20266 chip which controls the IDE RAID and upgrades ATA to the faster ATA/133.

<< Details

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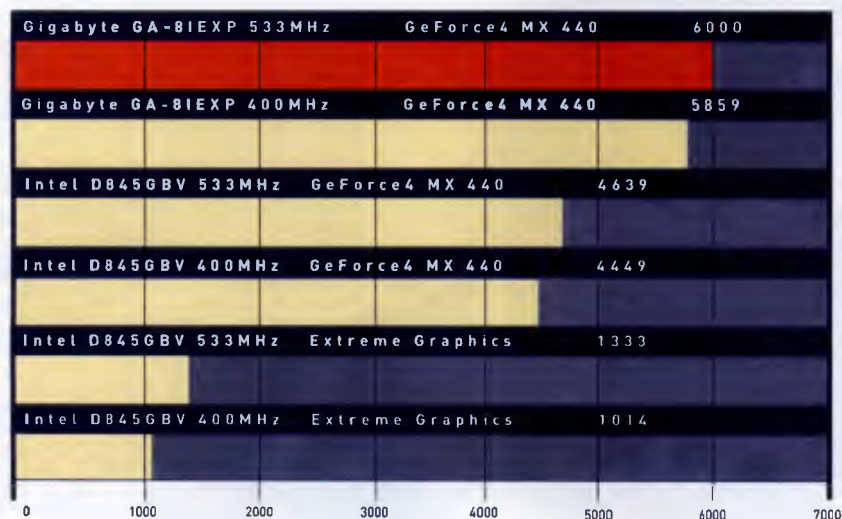
Online www.hallmark.com.au

Price \$349

PERFORMANCE

MOTHERBOARD TESTING RESULTS

3DMark 2001 Pro



Intel released two variations on the 845E in the 845G and 845GL chipsets. The "G" stands for integrated graphics (with the option of an AGP port if users wish to avail themselves of a superior graphics adaptor) and the "GL" variety is a "lighter" version, but doesn't offer an AGP option. Otherwise, the 845G and 845GL still offer the same as the 845E, with dual 400 and 533 MHz FSB support.

In a comparison between the Gigabyte GA-8IEXP (845E) and the Intel D845GBV (845G) motherboards, there was a considerable distance between the graphics performance of the 845E with a GeForce 4 MX440 adaptor and the native integrated DVT graphics of the 845G. The difference between running the 845E motherboard against the 845G motherboard fitted with the same AGP card was negligible.

HOW WE TESTED

Each board was run on a standard testbench consisting of 256MB of PC2100 DDR SDRAM, a 20GB IBM 7,200rpm ATA/100 hard disk and 32x CD-ROM drive. Each board was run with a 2.40GHz CPU (the old Willamette core) with a FSB of 400MHz, and then put through another run of tests using the 2.40GHz "B" (Northwood) CPU.

The 845G motherboard was tested using its native DVT graphics adaptor before duplicating the same tests using the Gainward GeForce 4 MX440 adaptor card (reviewed in *APC* June, page 50). All testing with the 845E was done using this Gainward adaptor.

The hard disk was prepared with Windows XP Pro. *APC's* benchmarking suite included test runs of Ziff-Davis' Winstone 2002 version 1.03 and Winbench 99 version 2.0 (available from www.etestinglabs.com), BAPCO Sysmark 2002 (available from www.bapco.com), Mad Onion's 3DMark 2001 Pro (available from www.madonion.com) and the Quake III Arena demo (available from www.quakefiles.com).

Winstone and Sysmark are application-based benchmarks

that run scripts based on actual commercial software applications like Microsoft Office XP, Lotus Notes and Adobe Photoshop. They give an account of how the system performs under a real-life workload.

Winbench is an artificial benchmark that specifically tests disk and graphics throughput. Scores are normalised and a composite Graphics and Disk Winmark score is generated. 3DMark 2001 is a 3D graphics-specific artificial benchmark for DirectX. It focuses primarily on gaming performance. Scores are generated in 3DMarks. All testing is done at 1,024 x 768 pixels x 16-bit colour depth, except for 3DMark 2001, which is at 32-bit colour depth.

These four benchmarks are all recognised and respected standards throughout the information technology industry. The Quake 3 Arena demo is not a commonly stressed benchmark but is widely used by gamers for OpenGL testing. Scoring is reported in frames per second (fps). Demos are run at 640 x 480 x 16-bit for raw OpenGL framerates and then run at 1,024 x 768 x 32-bit as a system stress test.

TWEAKING

Gigabyte has a history of providing its motherboard products with a path to tweak the performance in software. The traditional method has been through the BIOS system and onboard jumper pins. There is little scope for traditional tweaks on the GA-8IEXP and, since Intel locked its CPU clock multipliers, the usual trick of boosting the clock frequency of the board is not an option.

Gigabyte has released a beta of EzyTune 4, an overclocking utility program that runs under Windows. EzyTune works very simply by allowing the tuning of system bus frequency in 1MHz increments, memory frequency, AGP frequency, CPU clock (if permitted), and tunes voltages on the CPU, AGP and system memory. Thresholds can be set for alarms on critical systems like the cooling fan speed and system temperature.

Actual increases in any of the settings prove counterproductive, for example, a boost of the system bus from 133 to 135MHz (and a corresponding increase in memory frequency from 266 to 270MHz) produces 2,000 3DMarks less than if the system is run to normal parameters with the 2.40B GHz Northwood CPU.

How can this be? The first supposition is that there is system latency at work slowing the system down. Tweak one setting and the balance of the entire system is compromised so another part of the entity struggles to keep in sync.

The other argument is that the software is still in beta, where you expect the unexpected, although all tweaks up to 7MHz over specification proved quite stable. Perhaps the most plausible argument is that the immaturity of the CPU, chipset and the motherboard design (don't forget, the board came to APC as an early engineering sample) has made for less-than-optimal results. Typically, chipset technology takes time to mature. Board designs go through several minor tweaks over the course of the product's lifespan. The same goes for BIOS, which in some cases sees a new BIOS revision posted every few days. At time of writing and testing, neither Intel nor Gigabyte had any support to offer on the GA-8IEXP or the 845E/G/GL chipsets such as improved drivers.

A casual observer may discount the significance of the changes to the system architecture on the basis of these early tests. The 25% increase in FSB speed does not translate in these tests to a 25% performance gain across any measurable area — USB 2.0 has hardly made any impact so there appears little incentive for anyone to shift to PCs based on the new architecture, apart from a slight performance increase.

Yet there's a long way to go before every last drop is squeezed out of this technology. A wave of 845E products will flood the marketplace, probably peaking at the end of this year. This will be the time when a proper assessment of Northwoods' fortunes can be made with conviction. ■

INTEL'S D845GBV



The 845G chipset from Intel mirrors the 845E seen on our Gigabyte GA-8IEXP motherboard of the month in all respects bar one, and that is the inclusion of integrated graphics. Traditionally, motherboards that integrate the graphics are a bit more expensive than those without, but certainly not as much if the system were costed with separate motherboard and graphics adaptor card. The price of the D845GBV breaks this mould. They also traditionally do not perform as well as third-party graphics expansion cards and make it difficult to upgrade.

Intel's 845GBV is a board using the 845G chipset and is targeted at the corporate market where graphics capabilities are not paramount. It's a board that cuts down on the extra features: there's no IDE RAID, no ATA/133 adaptor, and no FireWire.

The salient points in the 845E, like the dual FSB speeds of 400 and 533MHz and integrated USB 2.0, are retained on the 845G so you would expect a similar performance to the Gigabyte on every level except the graphics.

Even though the Extreme Graphics engine adaptor is integrated onto the board, use of a third-party adaptor card is not out of the question as an AGP slot is also provided, giving OEMs and users the best of both worlds. By way of comparison, APC's lab tests show that under artificial and actual demonstrations even a GeForce 4 MX440 card will whip the Extreme Graphics adaptor by a fair margin.

Even without the extra features seen on the Gigabyte board, the D845GBV still offers bargain value and all the ability to leverage the advantages of the Northwood CPUs.

<< Details

Contact Synnex

Phone 1300 880 038

Online www.synnex.com.au

Price \$279

Striking the right chord with C#



Matt Overington takes a first glance at the Visual C# programming language.

The history of C# is probably known to most programmers. Initially unveiled by Microsoft along with the .NET initiative in June 2000, it is a strongly-typed, object-oriented programming language that has much in common with C++ and Java. C# was designed by Scott Wiltamuth and Anders Hejlsberg, who is famous for creating the Turbo Pascal compiler and leading the team that developed Delphi.

Like Java, C# compiles into machine-independent code which runs in a managed execution environment. With Java, the environment is Java Virtual Machine (JVM). And with C# it's the .NET runtime which is available for all the Windows 9x and NT platforms (including Me and XP). Microsoft has also announced that it is releasing a .NET platform for Linux.

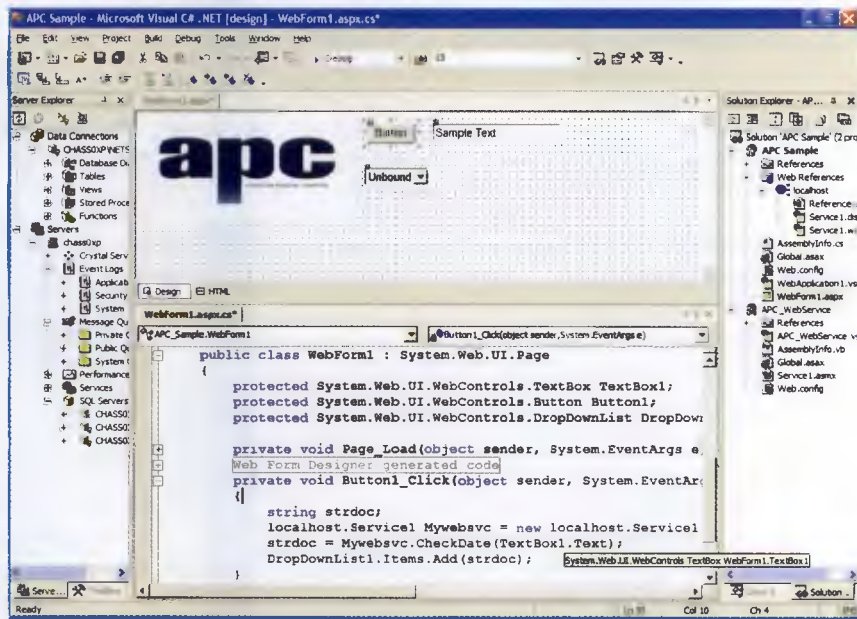
A large portion of the .NET framework library has been written in C#, and the two have been designed to work together almost symbiotically. C# has been made to make the best use of the .NET framework, while .NET has been designed to leverage C#.

C# is important but not pivotal to the success of .NET, and is being pushed heavily by Microsoft, allegedly having "... the power of C++ and ease of Visual Basic," according to Microsoft's Web site.

JAVA KILLER

In 1997, Sun initiated a lawsuit against Microsoft for building products based on Java technology that didn't adhere to the Java standards. Microsoft licensed the technology in 1995, and Sun alleged that Microsoft violated its agreement and, as such, was not entitled to later versions of the technology.

Microsoft has denied that C# is related to the "Cool" project,



Visual C# is currently the premier C# development environment and is being heavily pushed by Microsoft.

which was discussed in 1999 when unconfirmed rumours circulated that Microsoft was developing a new programming language like Java, but free of Sun's licensing requirements. In June 2000, product manager of the Microsoft .NET framework Tony Goodhew announced: that "[C# is] not a response to Java."

However, members of IBM's software division (who promote Java, along with Sun, Oracle and others) disagree. Microsoft already has its own programming language, Visual Basic, that uses its own models for programming, but it is not scaleable or multi-user, like Java. Because of the similarities between Java and C#, IBM's software division general manager Steve Mills said that, "C# is Java by another name."

Many programmers have encountered either C++ or Java at some stage of their careers, and most worth their salt would be fluent in at least one or the other. According to a study by market researchers Evans Data, 12% of programmers in North America have already taken up C# — a strong indication that it's gaining momentum, whether Sun likes it or not.

WHAT'S DIFFERENT?

In structure and use C# is close to a blend of C++ and Java, albeit with some modifications to both. Microsoft has

analysed where programmers commonly make mistakes, and has worked to simplify the process. There is only one way to do most tasks within C#, which makes reading and understanding code much easier — it also speeds up the learning process because you do not have to learn alternate methods.

One of the changes you will immediately notice is that C# has done away with pointers in "safe" code. Things can become extremely confusing when using pointers under C/C++, and many runtime errors can be caused by poor pointer control on behalf of the programmer. Also, because it runs using the .NET runtime environment, C# features automatic memory management and garbage collection — similar to Java.

Compatibility across a range of platforms has also been pivotal. Because the .NET runtime is available for a number of platforms (like the Java Virtual Machine that is required to run Java applications), a great deal of care has gone into how C# handles changeable types (like int and float).

The default ranges of float and int can change in C++ depending on your processor, but this has been fixed in C# so that the ranges are constant — irrespective of what hardware you are using. This gives the code a higher portability as you don't need to code for specific hardware configurations or processors.

C# has been developed to meet the needs of a changing world of technology. One particular response to ecommerce is decimal — introduced as a new type to handle financial calculations. Boolean management has also been modified, and only "true" and "false" values can be used for Boolean variables, unlike in C++, where 0 equates to false and 1 equates to true.

OBJECT-ORIENTED

Since the development of C, the programming community has seen many programming models come and go: from structural to procedural; from procedural to modular; and finally object-oriented. C++ is labelled an object-oriented language, but it is not a true object-oriented language in that it allows other object models to be employed by the programmer.

When programming in Java, primitive data types (such as int, float and double) are not treated as objects, but C# is a completely object-oriented language which negates the need for Java wrapper classes. C# uses structures to enable simple data types to become objects.

TYPE SAFETY

One of the benefits of C# is that it has been designed so that most of the errors that code can generate will appear at the time of compiling, and not when running the compiled version. All your variables have to be initialised before you can use them. By default, all value types are 0, and all the reference types are assigned the value of null. Switch and case statements

ONLINE RESOURCES FOR C#

Although the resources on this month's cover CD are enough to get you started in the world of C#, a swag of Web sites devoted to C# have sprung up virtually overnight. Below is a list of where to go if you want to strike a chord with C#:

MASTER C#

www.mastercsharp.com

Contains a number of articles on .NET, how to use C#, and is useful for people who are just beginning to test the waters.



C# CORNER

www.c-sharpcorner.com

Hosts lively discussion forums, links to other .NET-related sites, and a good tutorials section.

THE C# SEARCH ENGINE

www.codehound.com/csharp

Houses a basic C# community calendar and an exhaustive search engine that can be used to find any type of C# related matter.

GOT DOT NET

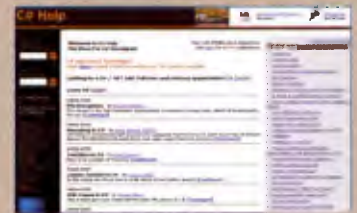
www.gotdotnet.com

Not specifically C#-orientated — instead houses forums, latest news, and what's-hot in the world of .NET, and XML Web services.

C# HELP

www.csharpshelp.com

Possibly the best site for beginners to C#, with articles covering the basics of how to produce a random number right up to advanced programming concepts. Forums, a job board and searchable articles help make it a must-see.



.NET101

www.dotnet101.com

.NET101 focuses on the entire .NET framework rather than just focusing on C#, but still contains many useful articles for the intermediate programmer.

THE CODE PROJECT

www.codeproject.com/csharp

The Code Project is a strong Web resource for developers, and contains free source code and tutorials, sample code, and links to downloads.

MSDN.NET

msdn.microsoft.com

The Microsoft Developer Network homepage. Here you can get the latest news and .NET related downloads straight from the horse's mouth.



don't allow fall-through, and each array is zero base-indexed and bound-checked by the compiler. All of this helps the programmer, so worrying about data types is a thing of the past.

NO MORE "DLL HELL"

Programmers who are used to working under Windows will be well aware of DLL versioning issues (often referred to as "DLL Hell"). If an application that is running is using a shared library and another application makes a change to the same shared library, the first application will crash.

Using C# you can version your DLLs, so your application will always be compatible with updated versions of the DLL. The .NET runtime will always be able to load the correct version of the library as required by the application.

Also, DLL registration has been done away with, so if you want to update the version of your application, all you need to do is copy it over the older version. This is possible because the .NET framework has introduced assemblies that are self-describing and don't need registering anywhere.

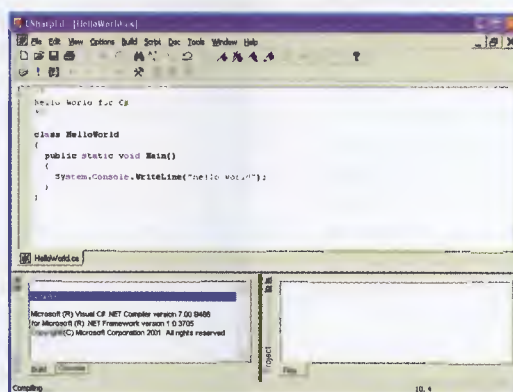
USING THE GARBAGE COLLECTOR

The garbage collector is built into the .NET runtime and uses an algorithm to find and mark objects that are in use. It frees up memory by getting rid of unused objects, which removes you from having to deal with the memory space that is allocated to objects. After some practice, it is possible to structure your code to take advantage of the garbage collector so that any unused objects are freed, and the heap is compacted.

The garbage collector is run when needed (such as when an allocation fails) and when it is invoked, it moves live objects around in memory. The basic idea is that local variables don't survive the first garbage collection, and that any objects that do survive a collection will probably survive future ones.

If a variable survives its first garbage collection, then it is probably owned by an application-level object, and will therefore remain in memory. If it passes subsequent garbage collections, then it is being used by the application, and will continue to remain in memory.

The running of the garbage collector is based upon free memory. It starts out running on all bottom-level objects that have never been examined. If — after the examination of all zero-generation objects — your application needs



► It is tradition to start learning any new programming language by coding the Hello World program.

more free memory, the garbage collector will be invoked to examine all first-generation objects (then the second, third, and so on). The idea behind this is to ensure that you run the garbage collector as little as possible, which will streamline the performance of your application.

As a programmer, it's a good idea to not create any more objects than you really need, thus avoiding running the garbage collector too often (as performance will be affected if you rely on it heavily).

You don't need to worry about creating too many objects, but you

don't want to waste any that you've already got sitting in memory. For instance, if it's possible to recycle (or reuse) an object instead of creating a new one, then do so.

TAKING OUT THE TRASH

The freeing of non-memory resources in C# is a manual process, but not a tedious one. Basically you implement the `IDisposable` interface when you have an object that owns resources that you want to free. After you have finished using the object, all you have to do is call `Dispose()` to free any resources that it has used (such as file handles, locks, and database tables).

If you create a class that uses resources that can be freed, it's best to implement the `IDisposable` interface for the class. This means that you can later free resources using the `Dispose()` method. If you forget to `Dispose()` of all your non-memory resources, you can also invoke the `Finalize()` method to take care of resources.

In C++, destructors are invoked by inserting a tilde (~) before the class name. In C#, you can use C++ style destructors to finalise the destruction of objects or declare a `Finalize()` method. Both syntaxes work out the same, as the C++ destructor is replaced by calls to the `Finalize()` method when the code is compiled.

Strictly speaking there is a difference between the C++ and C# handling of object disposal. In C# the `Finalize()` method is not used when an object goes out of scope, but it is instead called as part of the garbage collector operation. The syntax you choose to use will largely depend on what you are accustomed to using — if you are moving to C# from C++, you will probably use the ~ destructor, whereas Java programmers and those starting out in programming will probably learn to use the `Finalize()` method. ■

MSI

845 GIVE ME 533



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Channel

USB 2.0

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845E Max2-BLR

Intel 845E chipset Socket 478 ATX

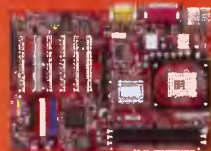


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Intel 845G chipset Socket 478 ATX

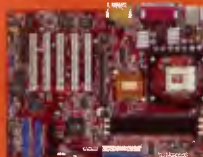


USB 2.0
Intel LAN

- Support Intel® Pentium® 4 processor to 2.4GHz
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Link to the Future

Stop the hack attack

Protect your Mac from a hack-attack by setting up the Mac OS X firewall. Stephen Withers shows how.

It would be fair to say that a firewall is a near-essential feature for any Internet-connected computer. If you're connecting a network of computers, a firewall appliance or a computer configured as a dedicated firewall is the basis of security. However, that option is probably too expensive for most individual users, who should consider firewall software that runs on the computer they are trying to protect.

Firewall products for Mac OS X fall into two categories: those that configure the ipfw firewall built into Mac OS X as part of its Unix base, and stand-alone firewalls.

You don't need any extra software to use ipfw, but relatively few Mac users are comfortable with a command-line interface. If you have a Unix or Linux background — or you're simply keen to learn about what goes on beneath Aqua — the best tutorial we've found is: Building Your Own Personal Firewall by Stefan Arentz (<http://wopr.norad.org/articles/firewall/>). You do need to know the basics of using Terminal and the command line.

For further reading, try the section on firewalls in the FreeBSD Handbook (http://www.freebsd.org/doc/en_US.ISO8859-1/books/handbook/firewalls.html) and the ipfw manual page (type `<f>man ipfw<f>` in Terminal).

If you didn't rush off to read that other material, you're

probably looking for an easier way of setting up the firewall. We mentioned BrickHouse last year (APC August 2001, page 145), and a few alternatives have since appeared.

BrickHouse is perhaps a little expensive at \$US25, when you consider it is just a front-end for the system services that do the real work, but it does make life a lot easier. However, developer Brian Hill does give permission for continued use until you feel you've received \$US25 value, so it's largely a matter of conscience.

Impasse seems better value at \$US10, although it does have a limited trial period. Its "easy" mode makes setup simple and provides settings that should suit most users who are not connecting via NAT. A "tick the boxes" interface lets you select rules such as Allow Web Sharing, or you can switch to "advanced" mode and look at the corresponding ipfw rules.

Something to watch for with this type of program is that your rules need to be made "permanent" once they are working to your satisfaction. This is so the firewall runs the way you expect each time the Mac is restarted. Typically, there's a button or checkbox for this setting: for example in Impasse, it's in the Options tab and labelled Automatically Start Firewall On Startup; in BrickHouse, click the Install button.

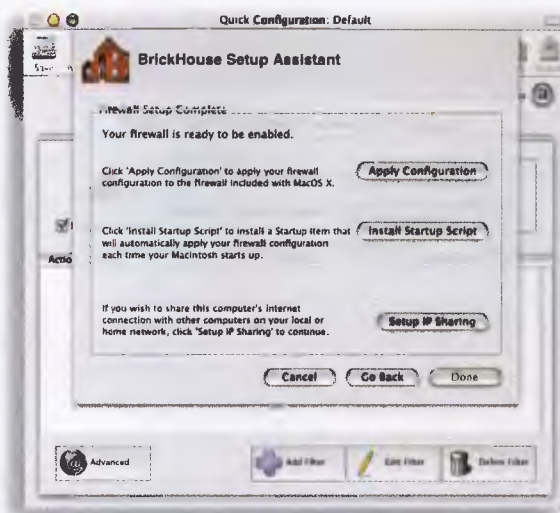
SunBurst's sunShield is free, and though it does save you messing with Terminal windows to configure the firewall, you still need to understand the ipfw rules. The developer plans to add more features, so keep an eye on sunShield even if it doesn't meet your needs right now.

FireWalk X 2 is a self-contained firewall for Mac OS X. Features include a setup assistant, a "stealth mode" that completely ignores requests for any services that aren't running, and application-specific rules that can allow or deny network access by a program depending on the current user and the IP address being accessed. Be aware that in its unregistered state, FireWalk is only active for two hours following startup.

If you're looking for a shareware firewall for classic Mac OS, it's hard to go past Sustainable Softworks' IPNetSentry. It works differently to most firewalls in that it watches IP traffic for suspicious activities, and when it sees any it blocks traffic from that source. At the same time, you can tell it to allow access to a particular service from a specific IP address.

This is so you can, for example, monitor the Web cam inside your house from your office computer while it remains invisible to any other system. Sustainable also offers IPNetRouter, which is designed to act as an Internet gateway but can also be configured to provide a firewall.

There are a few commercial firewall products on the market. Symantec's Norton Personal Firewall (also available as part of the Norton Internet Security package) includes versions for Mac OS 8.1 to 9.2 plus Mac OS X 10.1. Personal Firewall was



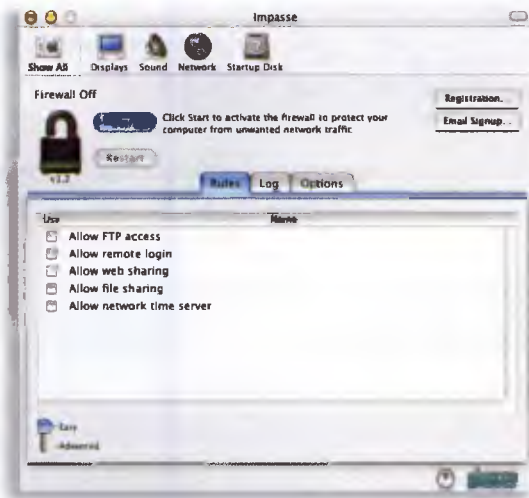
► BrickHouse and Firewalk X both include setup assistants to make it easier for novice users to configure the firewall. BrickHouse also simplifies sharing an Internet connection with other computers on the same LAN.

► The Easy mode within Impasse lets you allow or deny access to common services by name. Switching to Advanced mode reveals the corresponding firewall rules.

originally developed by Open Door and sold as DoorStop, and that company's Who's There? firewall advisor is also included in Norton Internet Security. Who's There? can also be used in conjunction with IPNetSentry.

Like Norton Internet Security, Intego NetBarrier has a wealth of features. They include a firewall, intrusion detection, filtering of outbound data for sensitive information such as credit card numbers, and spam and banner ad blocking.

Various Web resources deal with Mac OS security matters like firewalls — a good starting point is www.securemac.com.



HOUSEKEEPING WITH CRON

Another issue we've raised previously is the way that Unix's heritage of round-the-clock operation isn't consistent with the way most of us use our Macs. In particular, daily, weekly and monthly housekeeping tasks are scheduled for the small hours of the morning, when most Macs are either witched off or asleep.

Brian Hill's MacJanitor (yep, the man behind BrickHouse) was possibly the first utility to let you force the events to occur immediately. It's since been joined by a selection of other utilities that address this problem.

First some background. In Unix and its derivatives, a program called cron runs in the background. It reads a file called crontab, which contains a list of tasks and the time at which they are to be run. When the appropriate time comes around, cron starts the task. The problem (from a Mac OS X user's perspective) is when you start up the computer in the morning, cron doesn't run the tasks that it was supposed to the night before, it just ignores them.

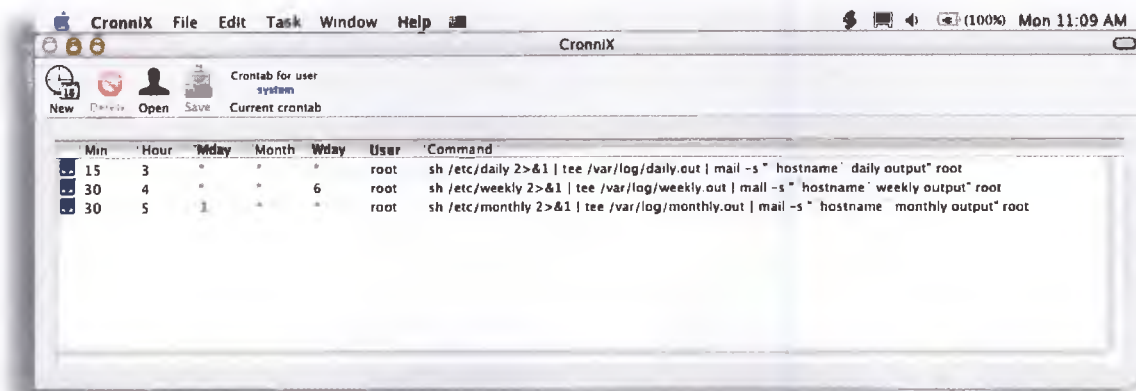
Cronaid works by adding a task to crontab that periodically runs Cronaid. Each time Cronaid is triggered, it compares the time that the three maintenance tasks last ran (according to their logs) with the time they were supposed to run (according

to crontab), and runs any that are overdue. Ingenious, but there are two catches: it's the only program mentioned here that isn't free; and do you want the housekeeping to occur just after starting up and while you're itching to set to work, or would you rather have it happen at a time when the computer is switched on but you're not particularly busy?

If the latter is more attractive, consider CronniX. This is a general-purpose GUI for cron, so you can easily change the housekeeping tasks to run at times your computer will be switched on but idle. And for those occasions where the first of the month falls on a weekend or public holiday, CronniX lets you start a scheduled task immediately. It also makes it easier for you to schedule your own tasks.

CronMaster is an AppleScript that runs the three housekeeping commands. If you don't want to see the Terminal at all, it's not for you. But it's small, free, and saves you having to remember the Terminal commands. Cronathon is a more fully worked AppleScript that conceals the Terminal completely and lets you choose whether to run just the daily task or all three.

Your choice will depend on your working habits and preferences, but unless you leave your Mac running overnight one of these utilities should be part of your toolkit. ■



► CronniX provides a GUI for the cron utility. This makes it easy to reschedule the maintenance tasks for more suitable times or to run them immediately.

Get organised with **Entourage**

Stephen Withers show how to make the move to, and get the most out of, Microsoft's Entourage X emailer and organiser.

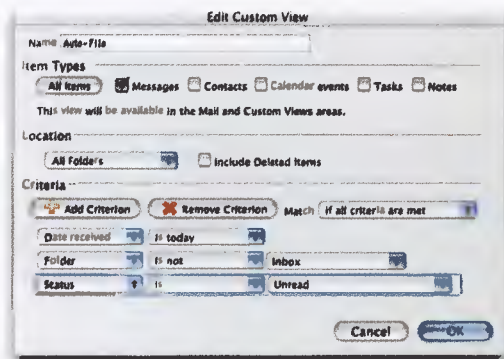
If you're a Mac and Microsoft Office user, you may find Entourage X a tempting choice. One snag that you may find however is that importing the contacts from your old PIM and the address book from your previous email program can result in a large number of duplicate entries.

It's best to remove duplicate contacts straight away so all the links with messages, tasks and so on are made into a single contact record for each person. Unfortunately, there's no effortless way of doing this job. The best method I've found is to import all the data, display the Contacts list in name order, and open any duplicated entries and position their windows side by side. This makes it easier to see which entry is the most complete, and which pieces of data need to be copied from the other.

If you didn't do this chore straight away, it might be easier to keep the entry that has accumulated the most links, and manually transfer any extra data and links from the other. In any case, if you're addressing an email and two entries for the same person show up in the Autocomplete list, take that as a cue to clean up your records for that contact.

By the way, Entourage does well importing data from other programs. With Claris Emailer, for example, it draws the data directly from the older program via Apple Events. Although Palm Desktop is one of the programs supported by the import process, it's not obvious that you need to start by exporting information from it into a text file, which you can then import into Entourage.

One of the things I liked about Emailer was the Auto-File



► Custom views let you select Entourage items of particular interest. This one mirrors Claris Emailer's Auto-File Log window.

Log. If you set up one or more rules to automatically file incoming messages, you could specify that a corresponding log entry be made. Since the Auto-File Log acted like a folder, it was easy to scan through the log and open the messages you wanted to read immediately.

Entourage can automatically file messages, but it doesn't have a log feature. You can control-click (or right-click with a two-button mouse) on the Mail button at the top left of the window to see a menu of folders containing unread messages, but that's not especially convenient. My preference is to simulate Auto-File Log with a custom view.

Select New Custom View from the New popup menu in the Mail window's toolbar. In the resulting Edit Custom View dialog, give the view an appropriate name, such as Auto-File, and ensure only the Messages box is checked in the Item types section. Under Location, ensure All Folders is checked, but uncheck Include Deleted Items. You also need the following entries under Criteria: Date received Is today, Folder Is not Inbox, Status Is Unread, and Match if all criteria are met.

If you leave your computer running overnight, this view will overlook any messages that arrived before midnight the previous evening. The obvious answer is to change the Date received criterion, but settings other than Is yesterday, Is today or Is tomorrow are very slow if you have many saved messages. If this is an issue for you, consider a second custom view with Date received Is yesterday instead of today.

Another view you may find useful is one I call Today's Unread. The standard Unread view shows all unread messages except those that have been deleted or that are in the Outbox, while the Received Today view shows all messages that arrived today unless they have been deleted. Today's Unread is very similar to my Auto-File view, but it also includes unread and uncategorised messages from the Inbox.

The criteria are therefore: Date received Is today, Status Is Unread, Category Is None, and Match if all criteria are met. The reason for filtering by category is to remove messages identified as junk mail by Entourage.

If your list of folders, newsgroups and views is longer than the window can accommodate, there's an option that frees up some extra real estate. Choose General Preferences from the Entourage menu, and if necessary select the General tab. Check the box labelled "Display small navigation buttons (maximise Folders and Views lists)", then click OK.

An extra seven items will be visible in the folder list. Although this makes buttons for switching between mail, calendar, tasks a lot smaller, they are still about the same size as the tool buttons along the top of the main window, so you shouldn't have any trouble hitting the target.

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Workshop

How to store your stuff

Is your data in dire straits? Serdar Yegulalp shows us how to make the most of your hard drive and removable storage options.

For those who don't get the title, it comes from a monologue by American comedian George Carlin: "If you didn't have so much stuff, you wouldn't need a house. You could just walk around all the time. A house is just a pile of stuff with a cover on it. You can see that when you're taking off in an airplane."

Well, I've never seen my house from the air but when it comes to all the stuff that's stored in my PC, I know exactly how he feels.

My first PC came with a 20MB hard drive. Coming straight off a computer with twin 1.2MB floppy drives, that was more than I knew what to do with. Nevertheless, within a few months time it was full. All those games that I didn't want to run off floppy disks, all of the game save files and word processing files once relegated to floppy added up quickly.

So, here I am 15 years later, with over 100GB of storage online, a DVD+RW drive, CD-RW drive, Zip 250 drive, and even a lowly 1.44MB floppy drive. Somehow, I still don't have enough room for everything.

FAT FILES AND BULKY BLOCKS

The most common way people store things on their PC remains the hard drive. Even though hard drives have exploded in size and speed, the costs have collapsed at just about the same rate. 60GB hard drives are no longer outlandish — I routinely see 100GB drives for sale in consumer-level computer stores. And Windows XP is far better suited to handling such massive amounts of space than Windows 95, 98 or Me.

Windows 95 employs the same file system that Windows 3.x and DOS 6.2 did before it — in fact, Windows 95 was a fancy front-end for DOS with some 32-bit components. (At the time it was quite unthinkable to make this revelation to Windows lovers, but enough time has passed to make this a statement of fact.)

DOS's file system was called FAT16 — the FAT meaning File Allocation Table and the 16 meaning 16-bit. A 16-bit address was used for every block of space on the disk allocated to a file, which only allowed for 65,535 blocks in total. The bigger the disk, the bigger each block — and the more wasted space because of this system. Using FAT16 on a disk over 2GB resulted in a terrible waste of space. Fortunately, even a 1GB

hard drive at the time was considered a luxury!

As Windows 95 gave way to Windows 98, larger hard drives became common. The old FAT16 system just didn't cut it anymore. FAT32 arrived using 32-bit addressing and featured a slightly more robust system for allocating and tracking space. FAT32 became the file system of choice for many Windows folks, but there was a third contender waiting in the wings courtesy of the Windows NT camp: NTFS.

NTFS was written from the ground up to support servers and heavy-duty workstations. However, its robustness came at a price: both the additional disk space used to store the NTFS data objects, and disk performance. Files could be given access control lists, or ACLs, which dictated who could and couldn't read or write them. Also, the metadata — or the information relating to the actual data stored on the disk — was stored with greater redundancy and tracked in a more robust way.

Windows XP was the first consumer-level version of Windows to include NTFS as a standard option. Granted, you can still format a drive as FAT16 or FAT32 — and you probably should if you're dual-booting — but using NTFS is a much smarter idea on drives bigger than 4GB for the reasons quoted above. With XP you can format new volumes installed in the system, or most removable volumes as either FAT or NTFS. The choice is yours.

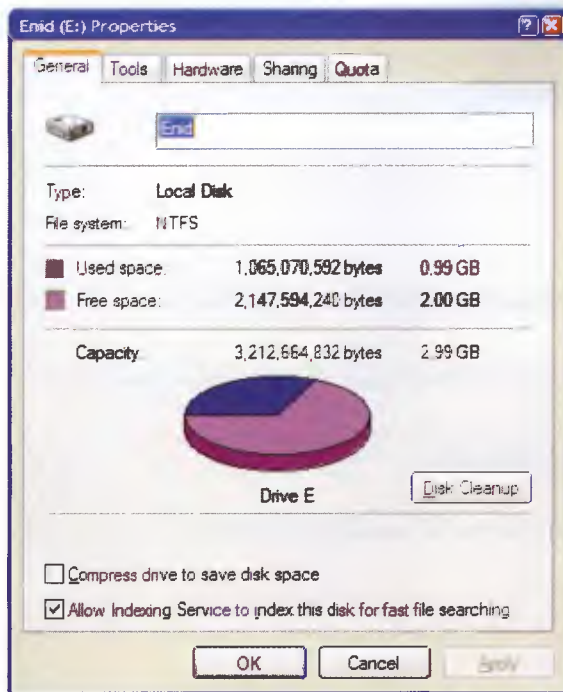
On smaller drives, FAT is fine since the robustness of NTFS comes at the cost of disk space. On anything bigger than 4GB, go NTFS. Given how fast most commercial hard drives are, the difference in speed with NTFS has become negligible.

IS MY DISK IS FAT OR NTFS?

This is easy enough. Open My Computer, right-click on the drive in question, and select Properties. Under File System you'll see FAT16, FAT32, or NTFS. If you installed Windows XP by booting the installation CD and wiping the system clean, the installer would have given you the option of formatting the new disk partitions for the OS as FAT or NTFS. The choice between FAT16 and FAT32 is made automatically by the system during setup and is dictated by the size of the volume — more than 4GB and FAT32 gets selected automatically. Most pre-built XP systems come with NTFS volumes, especially XP Professional which allows a much greater range of controls over disk objects than XP Home.

HOW DO YOU CONVERT AN EXISTING FAT TO NTFS?

This is a little trickier, but very possible. Drop to a command line by typing cmd in the Start/Run... dialog box, and type:



convert <drive> /fs:ntfs

where <drive> is the drive letter of the volume you want to convert to NTFS. If this is a system volume you'll need to reboot, but anything that isn't a boot drive, a system drive or doesn't have a swap partition on it will be converted on the fly.

WHAT IF I HAVE AN NTFS DRIVE AND WANT TO GO BACK TO FAT32?

Well, this is where things get sticky. Generally, the only time I've seen this is when people have compatibility problems of some kind. A typical scenario may be if they're dual-booting Windows XP with another version of Windows (or another OS) that doesn't support NTFS and they want to get to the files on that volume. There's no built-in way to do this, but there are third-party programs that will let you pull this off.

One such program is PowerQuest's commercial product PartitionMagic (www.powerquest.com). This program has been around for quite some time and is now in its seventh revision, which adds Windows XP support. A trial version is available online. There's also a shareware product called BootIt, which does the vast majority of what PartitionMagic does for a fraction of the cost (US\$29). A trial version is available for download from www.terabyteunlimited.com.

Keep in mind that I'm not endorsing impulsive or "blind" use of any of this type of software — I'm firmly of the opinion that if you need to dual-boot, you should plan ahead first. Using these programs can totally destroy your file system if something goes wrong mid-process. That said, I've used them several times on multiple machines without any problems, but I did take the precaution of having offline backups of all my data, just in case.

► A volume's Properties page will tell you what file system you're using on it. FAT32 and NTFS are most common in WinXP, but UDF also appears if you're using DVD media.

THE RIGHT FORMAT

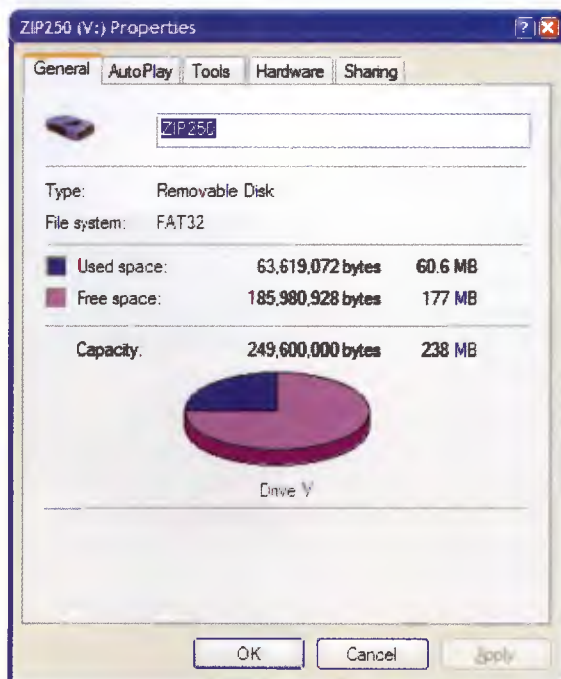
Let's assume you've decided to add a new hard drive to your computer and you wish to format it. Once the drive has been installed and recognised by XP, you'll need to partition and format it. Disks don't come partitioned from the factory, since the manufacturers have no way of knowing what kind of PC or OS they'll be used in.

The tool for setting up drive partitions is called the Disk Management tool, and it's buried in XP. To get to it, right-click on My Computer and select Manage (I bet you are wondering what that was for). You'll get a two-pane display: click on Disk Management in the left-hand side.

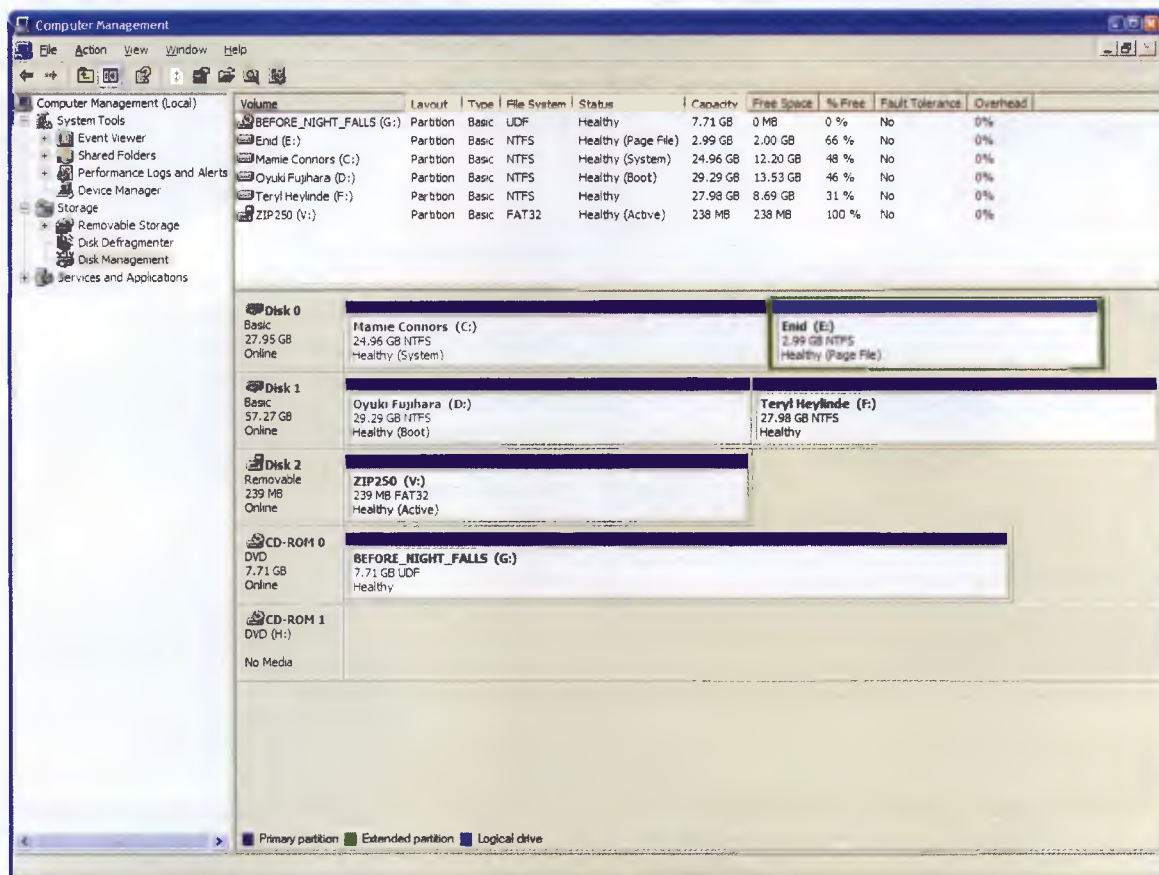
Each drive, both fixed and removable (including CD-ROMs and DVDs) will show up in the diagram that appears. Right-click on the drive you just added and select Create Partition, then type the size for the partition.

Right-click on the partition itself, select Format, and choose the file system you want to use. Formatting itself may take some time, so don't wait around for it.

A lot of people have asked me about enabling compression on NTFS volumes. When you format a volume as NTFS, you



► A removable drive's media properties. Since this is FAT32, a proportionately smaller amount of disk space is taken up by the file system metadata.



▶ The Disk Manager tool in Windows XP works mainly with fixed drives and removable cartridge media. Note that the DVD drives use the UDF file system; in order to work with them, a third-party app is needed.

get a checkbox option to enable compression. This allows some types of files to be compacted to save space, however, the compression algorithm is not very good as the compress/decompress routines are handled on the fly and can't afford to be very robust.

The best thing to do is to leave this option off and use a commercial program like WinRAR (www.rarsoft.com) to compress files as needed.

THE OLD SCHOOL

In XP, removable drives are handled a little differently than fixed disks. For one, the type of removable drive also makes a difference. Zip disks and other types of mass storage on cartridge media are classified as regular removable drives. CD-RWs are treated like CD-Rs — all of the erasing and adding of data is done through other apps, not the Disk Management console. DVD+RW discs are controlled by the software that's bundled with them, so they are similar to how CD-RWs are handled. DVD media uses what's known as Universal Disk (or Data) Format (UDF).

CD-Rs or CD-RWs are probably the most common form of removable media at this point, even more so than Zip drives.

Just about every PC that comes off the assembly line has a CD-RW drive — CD-Rs themselves are dirt cheap, far more so than Zip drives — and the speed of a CD-RW drive is getting closer to what a Zip drive can muster.

The downside of a CD-R is that they write-once and therefore tend to be used for archiving rather than the kind of flexible offline storage that Zip discs allow. That's where CD-RWs take over — thanks to packet-writing software, you can drag and drop files to them as if they were hard drives, and erase and reuse them.

THE NEW KIDS ON THE BLOCK

DVD-RAM, DVD-R, DVD-RW and DVD+RW are the newest players in this game. All of them are used for data storage, not just video. The differences between them are significant — the biggest being in terms of how compatible they are with existing DVD hardware.

DVD+RW is the winner in this game; not only will DVD+RW discs play in existing DVD players, but in regular PC DVD drives as well. DVD-RAM is the worst of the group, as the discs aren't compatible with any other DVD drive or player.

I recently bought Hewlett-Packard's DVD100i drive and it

All you need to know about Windows XP

works very well with XP, even though XP has no built-in facility for handling DVD+RW. The drive comes bundled with Veritas' DLA software (www.veritas.com) to perform file operations — a package I'm not crazy about since no other DVD+RW system uses it, but the majority of the other DVD-ROM drives in my house recognise the discs so I'm not too worried.

The big problem is media. DVD+RW media doesn't have the best reflectivity, making it hard to read in some drives. And, a special high-reflectivity version of DVD+RW media isn't available yet.

DVD+RW will spoil you rotten in terms of how much you can cram onto a disk and how fast you can burn it. Each disc holds 4.7GB of information, and the discs themselves are about US\$10, or even cheaper if you buy them in bulk! That's a bargain compared to CD-Rs. Using the DLA software, I burned a 1.2GB backup file onto a disc in about eight minutes.

GET WITH THE PROGRAM

XP's built-in system for handling CD-Rs and CD-RWs is simple, but somewhat limited. I confess to never having used it. My recommendation is to go with a good third-party program. Nero 5.5 (www.nero.com) is probably the best of the bunch at this point, supporting Windows XP and even DVD+RW media. It also works seamlessly with a very broad range of hardware, so just about every PC with a CD-RW drive can support it. This is fast becoming the standard for CD burning programs, and for good reason.

Another program I'm fond of is something of an underdog and works well with a lot of the systems I've used — it's called CDRWIN and is available from an outfit called Golden Hawk (www.goldenhawk.com). The interface isn't as intuitive as Nero's and it doesn't have a lot of the slickness of that program, but it supports just about as many features (although it still doesn't support DVD burning yet).

The demo version of the program works with only two hitches: you can only burn at 1X speed, and it only works for 30 days. Download the full version for US\$39.

For the time being, DVD+RW is sating my thirst for storage. But within a year I'll be wondering what happened to that 120GB blue-laser HD-DVD format we've been promised ...■



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We explain the installation process, provide troubleshooting tips and introduce the new interface.

The 2 cover CDs are packed with tools to help you upgrade to, learn and make the most of Windows XP.

On sale at newsagents, order online at www.magshop.com.au or phone 13 61 16

Pumping **penguin** tunes

Matt Overington built a Linux-powered MP3 deck for his car. It's so cool that we asked him to share it with APC readers.

Bored of listening to the same tunes on your car hi-fi system? Tired of carting around tapes and CDs? Wary of plonking down \$500 or more for a CD stacker? It's time to free your inner geek. Take an old PC, load up a Linux distro, hook it up to your car stereo and you've got an MP3 deck with room for as many tracks as the hard drive can store. And that's going to be a lot of music, for next to no money!

And that's how this whole project started. The basic design called for a motherboard, CPU, hard disk and soundcard to be bolted together in a rack-mount case, with audio fed from the soundcard to the line-in on the car's tape deck.

Along the way we added a small LCD screen and a numeric keypad for navigating the songs contained on the hard disk.

The only basic requirement is a tape player with a line-in socket, either as a jack on the front, or as RCA connectors on the rear of the deck. Of course, it would also help to have some experience in soldering, electronics, and fiddling with Linux, but these aren't essential — time and patience can be substituted. Oh, and it'd help if you had a car!

POWERING UP

The first hurdle to overcome when designing your MP3 player will be powering the computer while the car is running. While it's true that a computer runs at a lower voltage than the car battery supplies, you can run some filters on the current and produce a clean signal for the motherboard and drives.



► A high-current fuse is vital to protect the car's battery.

Fortunately, much of the circuitry that you would use for this is already installed in your computer's PSU.

A simpler bet is to buy a 12v-230v inverter that will convert the battery's 12v DC output to 230v AC for the PSU. It will then run conventional computer hardware from the 230v AC current.

You can find inverters from electronics wholesalers like Altronics or Jaycar: a 300w unit powerful enough to drive a computer will cost around \$160. Although this is a large investment (and is probably the most expensive component in the system), it's often useful to have a 230v source in your car for other things too.

FUSE

Because the inverter could potentially send a surge back down the line and damage your battery, you need an inline fuse on the 12v side of it. The model that we chose for the project was fitted with a 35amp fuse on the 12v side, which would adequately prevent any surges from reaching the battery. Although many inverters are fitted with input-side inline fuses, it's vital to double-check its rating.

MAKING THE RIGHT CONNECTION

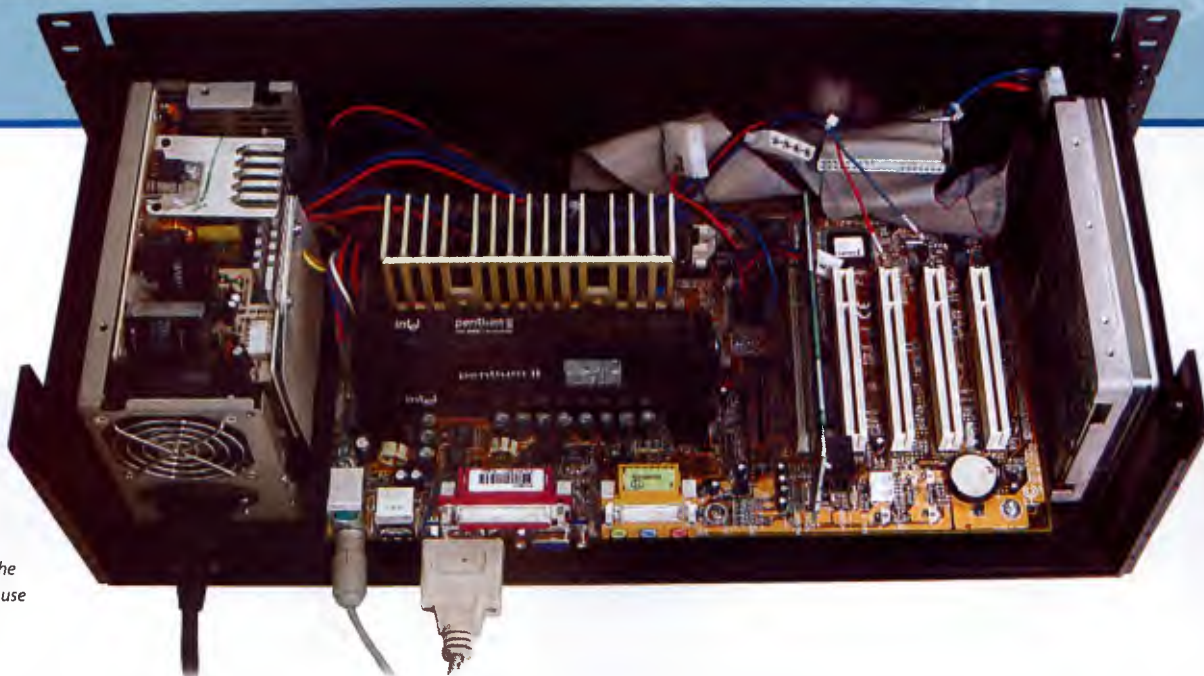
You probably won't want to attach a cigarette lighter plug to the end of the power cable as it's much neater if your cable is routed out of sight. Your best bet will be to take a line directly off the back of your car's cigarette lighter in parallel (if you are confident with removing your dashboard) and connecting directly to the terminals.

Many cigarette lighters only have bolt-on terminals, so you can install the inputs to your inverter directly onto the positive and negative terminals without needing to solder. The last thing that you want when running an inverter in a car is to suffer a short and send the body of your car live with 230v at 300w, but this can be avoided because the inverter is double-insulated.

Once you've got the input-side of your inverter



► You can rig up complicated filters for your power supply but it's easier to install an inverter.



► It is easier to hold the components if you use a rackmount case.

connected to the power supply, you can run your cabling under the carpet or around the side of the doors to wherever you run your Linux box. As our test car was a convertible with minimal security, we installed our system in the boot and ran the cable under the carpet.

INSTALLING THE PC

Because we chose to work with an inverter and regular computer equipment, installation of the PC to play the songs is very straightforward. The first place to start is by choosing a case to house your equipment. You can find a hi-fi rack-mount case in any electronics component shop that will be almost exactly the right size for the motherboard and associated components without requiring significant hacking. We opted for a 3-unit ABS plastic design.

You'll also be able to install the inverter and extractor fans so all that remains exposed is the power cable going into the box and an audio/data cable going back to the dashboard.

Attach the PSU, motherboard, CPU, and RAM to the inside of your box. And if you've got space, bolt the inverter to any free surface. Because the machine is running on Linux, you can get away with extremely low hardware requirements. Our test system was built around a 200MHz Pentium MMX, but you should be able to run hardware all the way back to a 100MHz 486. Try doing that with Windows...!

SOFTEN THE BLOWS

Desktop hard disks are not designed to withstand repeated impacts, so mounting a desktop PC in your car is not going to provide the ideal environment for skip-free listening. If the hard drive is mounted horizontally, each time you hit a pot-hole you will force the read head onto the hard disk platters, which will quickly wreck the drive. The trick is to mount the disk vertically. This way, if the read head is knocked out of alignment by bumps in the road it won't impact directly onto the hard disk platters. Instead, the disk will resynchronise and continue without doing any damage to the drive platters or read head.

Here's another tip: cut out some small rubber squares to mount underneath the screws that hold the hard disk in place to act as a shock absorber. We recommend using squares of old bicycle inner-tube — they are cheap and easy to work with.

SOUND ADVICE

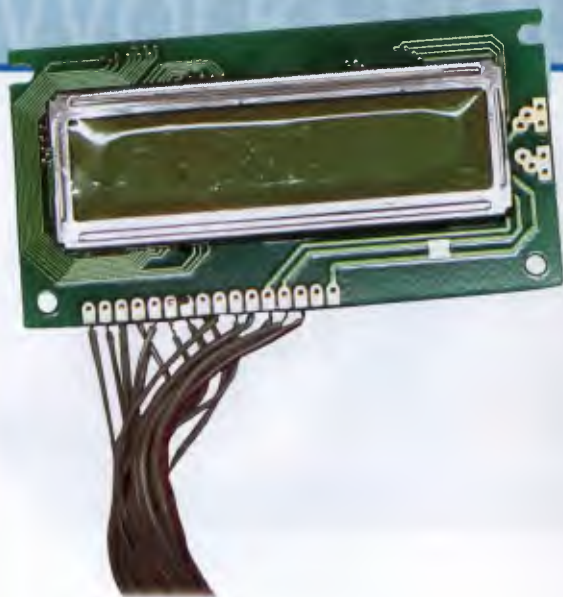
When choosing a soundcard, you'll need to consider a couple of things that can help the performance of your player. Chances are you'll be using an old computer to get your in-car MP3 player up and running, so it could be tempting to use any card you have sitting around. It will simplify things if you use a 100% SoundBlaster compatible soundcard because it is much easier to work with in Linux.

Aim for a SoundBlaster Pro, as this is a stereo card that is well-supported and very easy to work with. You don't need to worry about an externally adjustable volume on the card, as all control will be through your car stereo. Just leave the soundcard volume set to about the middle of its range.

You may opt for a motherboard with a built-in audio chip, but this will put more strain on your CPU. If you're already running a low-power CPU then it may keel over under the load. In this case, a dedicated audio processor is the way to go.



► An integrated motherboard will reduce the cards and the space required for your parts.



► The MP3 interface requires some thought. We opted for an LCD and keypad installed in a breakout box.

THE DISPLAY

One of the advantages of MP3s over conventional media is that you can embed song and artist information into each track and then display the data upon playback. It isn't vital that you include a screen on your in-car MP3 player, but it certainly will make it appear more polished. We chose a \$15 serial-port LCD from Altronics (www.altronics.com.au) that was easily programmed using an interface similar to that of a modem. You can find comparable models from electronics supply shops.

There are a couple of ways that you can mount the display, depending on whether you intend to maintain your car's resale value. If you have little regard for the price of your car, you can achieve the most impressive results by cutting a hole in the dashboard and mounting the LCD panel from the rear.

This is the neatest way to implement the screen, but it involves a lot of extra work and means the player will be mated to the car for life (or at least until you buy a new dashboard). All you need to do is find the screws that hold your dashboard in place, remove them, then unclip the dashboard and cut a hole in it so you can mount your LCD display from the rear.

A simpler method is to build the display into its own box and attach it to a surface in your car with double-sided tape. If you opt to run the box in the boot of your car you'll need to substantially lengthen the cables that will come with your LCD display.

As most pager displays run from a serial port, they only rely on 9 pins to transmit the signal to and from the PC. So, if you need to lengthen the range of the display you can simply splice longer cables in-between the display and the serial port on the motherboard. For a more advanced model, you may even want to construct a wireless connection between your display and the box using infrared. But that's a little beyond the scope of this article!

THE KEYPAD

What's the advantage in being able to see what songs are playing if you have no control over the selection? Due to the space constraints in a car, it's impractical to install a

full-size keyboard for scrolling through songs and albums. So we decided to wire-in a small alphanumeric keypad.

The keypad that we used ran off a PS/2 connection and only cost \$15. We followed a similar installation method to that of the display, by mounting the keypad directly to the dashboard in a small break-out box. If you're confident hacking away in Linux, then you will probably not have too much trouble getting a serial or PS/2 keypad to work, but there are alternatives.

You will find a copy of a CMMS, a linux distribution designed specifically for MP3 car players, on this month's cover CD. CMMS is a project administered by Tobias Weihmann and hosted at cmms.sourceforge.net. It is a stripped-down build that contains specialised drivers for specific hardware you might use in the car. It supports a range of external keypads and LCDs, and provides support for FTP and web server control.

Unless you're experienced with Linux, choosing one of the alphanumeric keypads or LCDs that are supported by CMMS will make your life much easier when the time comes to get all your components talking to one another.

LOADING YOUR MUSIC MIX

Now that you've got your MP3 player built and ready to drop into the car, how about some music to drive to? There are a number of ways that you can get your favourite tunes into and out of your MP3 player without having to resort to dismantling the box and removing the hard disk each time you'd like to change the tracks. Even though a 2GB hard disk holds some 2000 minutes of music, it's still a pain to swap out the drive!

The design we chose has provision for a wired Ethernet connection, provided that you install a network card into your box. This will enable you to run a CAT cable out to your garage from an internal network, and then use an FTP client to upload or download the songs that you'd like for the road. You'll need to have an FTP server on the car's PC, and the engine must be running so that the computer will have power.

You can find a way around these power requirements by installing a second battery into the car, but the extra



► Installation time. Now, where did I park my car?

convenience is barely worth the extra hassle and expense. Future designs may enable you to run a Web-server on the car player so you can log-in using a browser interface and modify settings.

The most immediate and obvious improvement would be the inclusion of a wireless Ethernet connection between the house and car player so you could synchronise your songs without even plugging your vehicle into the network.

UPGRADE OPTIONS

Initial designs had us using our own Perl code to drive the player, but we quickly realised that a lot of legwork was needed to code support for the LCD and alphanumeric keypad. It occurred us that someone else must have already done the job, so we went searching for possible solutions. We found CMMS — a German Linux distribution specifically designed for running MP3 car players.

If you load up this month's cover CD you'll find more detailed photographs, some instructions, and a copy of CMMS. It contains support for Text-LCDs, ID3-tags, and a number of keypads. CMMS relies on mpg123 by Michael Hipp for MP3 decoding and playback. To move data in and out without removing the drive from the car, support for FTP and Web server control is also included.

Upgrades that we have planned include adding a wireless Ethernet connection to the box. This would allow the box to be synchronised remotely without having to either remove the hard disk or plug in an additional cable.

Another upgrade option is a powered auto-shutdown routine. When the car is stopped and the keys removed, the MP3-player will automatically commence its shutdown routine, which will rely on the computer having power for about 20-30 seconds after the ignition is turned off.

Some minor adjustments will have to be made to improve the cooling of the player so that it doesn't overheat during summer. You've got the rest of winter to work that out!

So, good luck and enjoy rockin' the roads with your mate the penguin and some cool MP3 tracks. ■

UNCOMFORTABLE WITH A SOLDERING IRON?

If you don't want the hassle of constructing your own in-car MP3 player, there are a number of commercial versions available that have already been designed and built.

One of the better units APC looked at is the mStation (www.mstation.com.au), which is built around a removable drive design. A caddy is installed into both the car and a spare drive bay in your computer, and then a removable hard disk containing your MP3 songs, is swapped between the two. Copy all the songs you'd like to hear onto the drive, and then slip the drive into the caddy in the car when you'd like to play them back.

When you want to install more songs onto the drive, all you need to do is drop the cartridge into the PC dock and copy them directly. Although this is not as gratifying as constructing your own MP3 player, it's perfect for the less technically-savvy.



mStation car **3,000 song capacity**

music on the move!

mStation will change the way we listen to music. Imagine having a small jukebox containing your entire music collection, allowing you to listen to any track from every album you have ever owned, instantly - that's mStation!

Make MP3 From PC

Uncase from PC

Insert in Car

Operator and Enjoy

Compact as a CD discchanger, mStation is easily added to your existing car stereo and stores over 3000 of your all time favourite songs, allowing you to listen to any one of them instantly.

Working in conjunction with your PC, you can transfer any of your own CDs to mStation in less than 6 minutes using a specially developed version of Real Jukebox - the world's favourite jukebox software. Music is stored

Workshop

MX-appeal for U and I

Flash UI components can make drop-down menus, checkboxes and buttons easy for Flash developers, writes David Emberton.

Flash developers often note the difficulty of creating user interfaces. With HTML, browsers render all drop-down menus, checkboxes and radio buttons automatically. However, when scripting in Flash, it's a do-it-yourself proposition. Or at least it has been until the release of Flash MX.

Flash MX includes a set of interface building blocks called Flash UI components, which are akin to the Smart Clips in Flash 5 — pre-built pieces of animation and scripting that can be reused and customised. UI components extend the Smart Clip concept by allowing for Live Preview during authoring and enhanced ActionScript capabilities. More specifically, UI components can be "skinned" to match the look and feel of your design.

There are a number of UI components, each performing an individual task. For instance, CheckBox displays a single choice yet ListBox and ComboBox are a list of choices. PushButton triggers a script when the user clicks it or presses Enter or Return while RadioButton displays a single choice in a group of choices. There is also ScrollBar, which serves to add a scroll bar to a text field, while ScrollPane is a scrollable area for viewing movie clips.



Flash MX is bundled with a set of interface components.

By combining the UI components along with text fields and other objects, you can rapidly deploy user interfaces that have a standardised appearance.

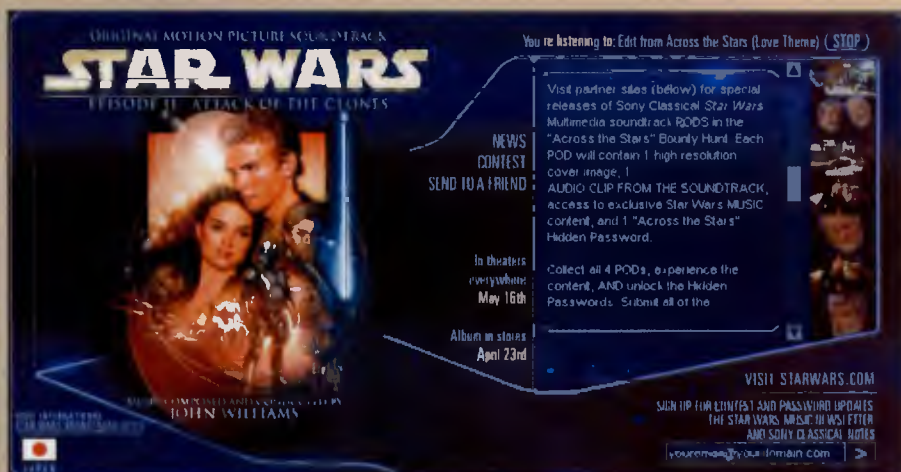
MAKING IT WORK

Although the components form the bulk of the Splendos interface, two text fields are needed to make it work. One

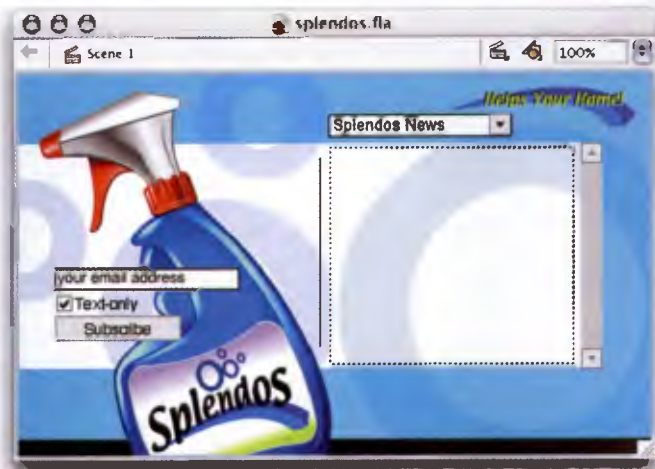
CASE STUDY

starwars.sonyclassical.com

Many of the artists and albums published under Sony's Classical label have Flash-enhanced Web sites, including the original soundtrack for Star Wars Episode II: Attack of the Clones. The site features a scrolling text area displaying news and information, as well as a newsletter sign-up form. As a demonstration of Flash's new user interface components, I'll show you how to build the same kind of email form and scrolling text functionality in just a few minutes. You'll find all the Flash MX source files on this month's content-packed cover CD. Our sample site is designed to present information about Splendos, a fictional brand of cleaning products.



The Star Wars Episode II: Attack of the Clones soundtrack site features a Flash interface.



► The finished product integrates four Flash UI components.

input field is used to capture the user's email address, and one dynamic field displays the site's content.

Flash MX allows for text fields to have instance names, an important change from earlier versions. In the past, text fields were assigned variable names and changing the variable also changed the contents of the field. While you can still do this, the preferred method is to assign the field an instance name, like myField, and then set its contents using myField.text or myField.html. Here's an example:

```
// Set the regular text
myField.text = "Hello world.";
```

```
// Set HTML text
myField.html = "<p>Hello world.</p>";
```

In this case, only the content field will need to be controlled with script, as the user types into the email field to set the value. To add the fields, use the Text tool and the Properties inspector to customise.

Email field
Type: input, single line
Instance Name: email

Content field
Type: dynamic, multi-line
Instance Name: content

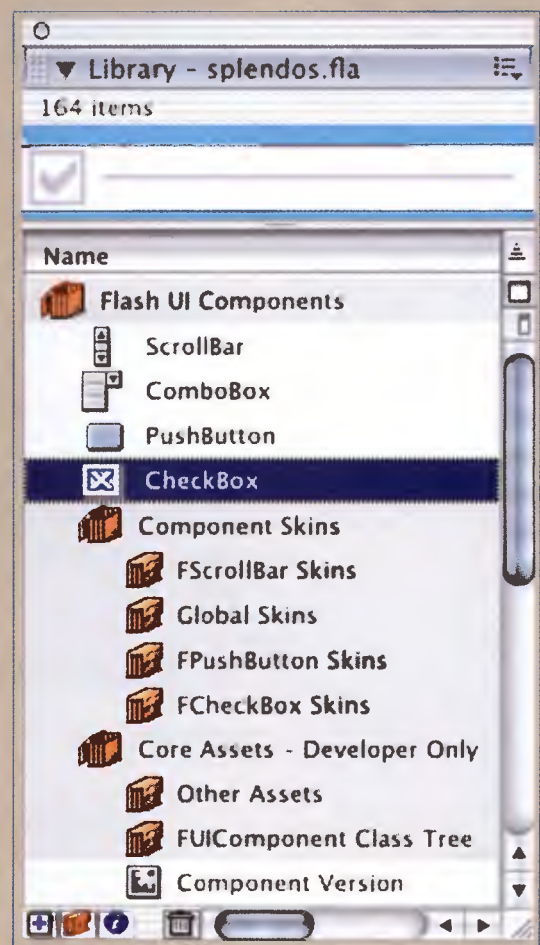
WITHIN PARAMETERS

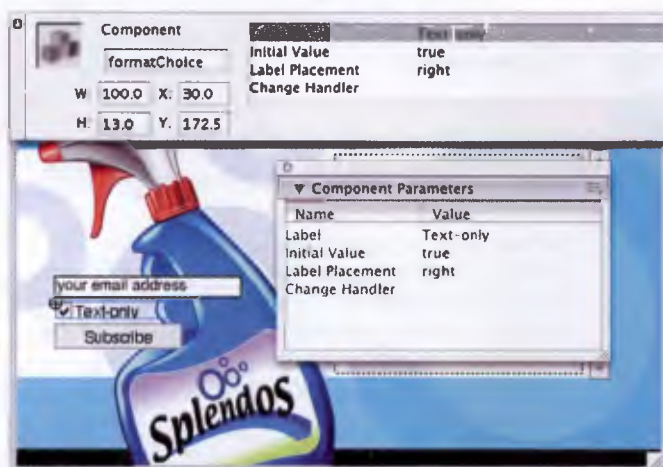
With the text fields in place, the next step is adding the user interface components. Our Splendos example uses four: a ScrollBar and ListBox for the content, and a CheckBox and PushButton for the newsletter form. The ScrollBar moves the text in the content field up and down, with the ListBox acting as switch between different sections. For the mail sign-up form, the CheckBox allows the user to choose between plain text or HTML delivery.

To add components, open up the Components panel and choose Flash UI from the drop-down list. The standard Flash

A LOOK IN THE LIBRARY

Any time you add a component to your movie, a collection of new symbols and folders are added to the movie's Library. These include the component itself, plus skin elements and supporting scripts. With the exception of the skin elements, you won't need to edit any of these. Here's what you can expect to see:





The Properties inspector and Component Parameters panels are used to customise the component instances.

be set with the Properties inspector, or with the Component Parameters panel. Just make sure you have the component instance selected, otherwise its parameters won't be visible.

The most important parameter for all of the components is probably the Click/Change Handler. You can specify any valid ActionScript function name as the handler, to be called when the component is interacted with. The ScrollBar and CheckBox don't need to be allocated special handlers in the Splendos example; the scroll bar will automatically control the content field, and the checkbox will simply hold the user's choice until they hit the Subscribe button (see below).

At this point you can test the movie to preview the interface. All the controls will be functional, but they'll still require custom ActionScript to be added before functioning properly.

SCRIPT ACTION

Two ActionScript functions are required to bring life to the Splendos site. These are placed on the first keyframe of the movie, so they can be called on at all times. The `displayText()` function fills the content text field with the right words, depending on what section the user chooses from the ListBox. For example:

```
function displayText(listbox) {
    switch (listbox.getValue()) {
        case "News" :
            content.text = "text";
            break;
        case "About" :
            content.text = "text";
            break;
        case "Where" :
            content.text = "text";
            break;
    }
}
```

(The actual content has been replaced by the word "text" here for formatting reasons.)

When the user changes the ListBox, the component sends

a reference to itself to the `displayText` function. By running a switch statement based on the value of the ListBox, the contents of the text field can be made to correspond to the user's choice. Switch statements are a lot like an if or else if block, and are a new addition to the ActionScript engine in Flash MX.

The `subscribeUser()` function sends the user's email address and message format choice to the server. In my example I've used a modified version of the mail PHP script from January's Flash Workshop (APC January, page 136). You can create your own back-end solution, or omit this function to disable the subscription form. For example:

```
function subscribeUser() {
    this.createEmptyMovieClip("temp", 1);
    temp.address = email.text;
    temp.textonly = formatChoice.getValue();
    temp.loadVariables("mail.php", "POST");
}
```

This creates an empty movie clip for holding the user's email address and format choice data. That movie clip is then prompted to send that data to the `mail.php` file, via the `loadVariables()` function. You can substitute "mail.php" for any URL, as long as it is not on another domain. For security reasons Flash doesn't send data to foreign servers.

With the ActionScript in place the movie is completely functional, but what about the appearance of the components?

CheckBox	(instance name: formatChoice)
Label	Text-only
Initial Value	true
Label Placement	right
PushButton	(instance name: subscribe)
Label	Subscribe
ClickHandler	subscribeUser
ListBox	(instance name: navigation)
Editable	false
Labels	[Splendos News, About the product, Where to buy]
Data	["News","About","Where"]
Row Count	8
ChangeHandler	displayText
ScrollBar	(instance name: contentScroll)
Target text-field	content
Horizontal	false



► The skin elements in the Library can be edited for a new look.

UNDER THE SKIN

The Flash MX component skinning system is a morass of symbols and scripts, but it is manageable if you take some time to get your bearings (and make a few trips to online help at www.macromedia.com/support/flash/). Each component has a collection of elements that make it up, and each little sub-element is "registered" (with script) to that component so that its appearance can be altered dynamically. A ScrollBar, for instance, has different skin elements

for its up and down arrows, the scroll track, and drag handle.

The best way to edit a skin is by carefully altering the existing element symbols, taking care to maintain all the instance names. If you're not concerned with changing the colours and style of elements dynamically, then you can just replace the element contents with flat graphics. In either case, all instances of a particular component will share the same appearance; you can't skin each individual copy with different artwork.

Finding the skin elements themselves is fairly straightforward. Open up the Library, and navigate to the Flash UI Components, Component Skins folder. Inside there will be a folder for each component you've used, plus a Global folder that contains elements shared between each of the components.

Double-click any of the descriptively named elements and edit the artwork inside. Live Preview will not reflect the changes you make, they only show up in the exported movie.

A FINAL WORD

In most cases, the Flash UI components will serve you faithfully. They do have some flaws — noticeable mostly if you are building movies with multiple levels. Flash Player can display several SWF files at once, in levels, much like a movie sandwich. However, the way components like ListBox have been scripted leaves them insensitive to levels and apt to display incorrectly on any level other than 0, the default. ■

FLASH HINTS

ZIP AND EMAILED PROJECTORS

Thanks to the security record of email programs like Microsoft Outlook, mail filters rarely accept EXE files attached to messages these days. Viruses are often hidden in Windows executables, like screensavers, and potentially even Flash Projectors — standalone programs that contain the Flash Player and your movie. If you plan to distribute your Flash Projectors via email, zip them up with a program like WinZip first. Flash is already a compressed format, so you won't save much in file size. But it saves you having to resend after finding that the mail server has stripped your attachment.

UPGRADE TO SORENSON SQUEEZE

If you plan on developing a lot of Flash-embedded video, consider upgrading to Squeeze from Sorenson Media. Sorenson provides the Spark codec that powers Flash video. They also offer an enhanced version of Spark Pro, which offers better compression and high-end controls. To get Spark Pro, you'll need to buy Squeeze for Flash (who comes up with these names?), for US\$299. I wouldn't normally recommend such blatantly tacked-on product upgrades, but Spark Pro offers file-size advantages that you can't ignore if you're doing a lot of Flash video work. For more information, visit www.sorenson.com.

SAVE BACKWARDS

Flash MX allows FLA files to be saved in a Flash 5 compatible format. Since upgrades are expensive, and not everyone is working on the newest version, saving backwards can really help during the transition period. To save backwards, just select Flash 5 from the list of formats when performing a Save As. If you are using any MX-only features, the program will warn you to pre-save.

MAKE THE MOST OF COMPONENTS

The Macromedia Flash Exchange features a stack of additional components that you can download. UI Components Set 2 in particular includes calendaring, dialog boxes, graphical buttons and even a pre-built progress bar. You will need to download the Extension Manager if you don't already have it, but you can expect to save a lot of time using components in your workflow. Each extension posted on the Exchange is tested prior to publication. And don't forget to see our cover CD for the Macromedia Extension Manager and a trial version of Flash MX.

SAVE A TEMPLATE

Flash MX includes a new template system that makes it easier to work with master documents. Tutorials are often fairly similar in structure but different in content, so it makes sense to create a template file. To do so, choose Save as Template from the File menu — you can create your own categories and descriptions. There's nothing special to be done to the movie file itself. When you want to create a new document from the template, choose New from Template from the File menu.

Powered-up presentations



Microsoft's Producer can energise hitherto humdrum PowerPoint presentations.

Joe Cassels shows you how.

Dull presentations could be a thing of the past. Now you can add commentary and video to a set of PowerPoint slides and publish them via the Net, Intranet, or onto a CD for viewing at any time.

If you fancy a go yourself, you'll find Producer on this month's cover CD, saving you a lengthy download if broadband has so far passed you by. It integrates with PowerPoint 2002, and requires Windows 2000 with Service Pack 1 or either version of Windows XP. Producer installs in the usual way and opens with the sort of wizard that is best avoided if you prefer an easy life.

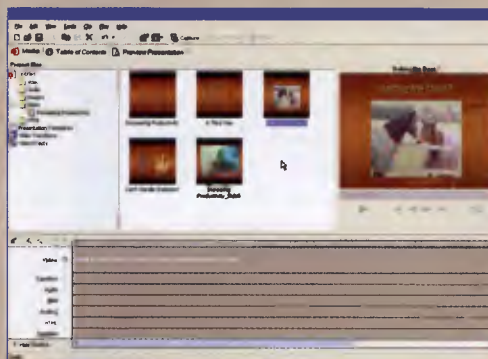
Essentially, Producer is Movie Maker with added slides. You have a timeline on which you can place audio commentary, video, slides and additional audio such as music and sound effects. Once you've combined all the elements, Producer publishes the presentation as an HTML page which you can keep locally or upload to an Intranet or the Web. You can even add fancy video transitions and choose which connection speed to publish your file.

Keep in mind that the higher the connection speed, the larger your file size. If you are planning to publish to the Web, keep it as small as possible so dialup modem users can also enjoy your work.

Microsoft makes the rather brave suggestion that Producer will record a presentation as it's delivered to an audience. However, it takes a bit more than pointing a camera at a speaker and running the program to do this. Chances are you'd have to run a separate recording session to archive a speech, which would rule this option out for most visiting speakers.

Even so, it won't be long before missing a presentation will merely mean you can sleep through it in your own time. ■

PRODUCING YOUR ONLINE PRESO

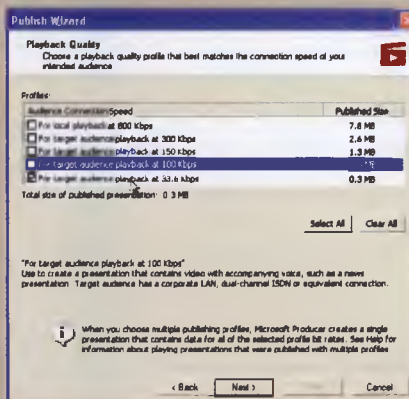


1. IMPORT SLIDES

Launch Producer and quit the Wizard. Double click on **Slides**, and again on **Import Slides**. Browse to a saved PowerPoint presentation and click **Open**. Once imported, highlight the slides and drag them onto the timeline.

2. CAPTURE NARRATION

Click on the **Capture** button to start the Capture Wizard, which sets up your audio/video options. Once it's complete, click **Capture** to start narrating. Advance the slides/effects with the **Next Slide** button. Click **Stop** to finish recording.



3. PUBLISH THE PRESENTATION

Save the audio/video file and Finish the Wizard. You can tweak the presentation and apply effects at this stage. When you're done, click the **Publish** button and choose a location and filename for your presentation. Finally, choose a connection speed (33.6Kbit/s is fine for Web use). Click **Next** and **Finish**.

Next month...

IN THE AUGUST ISSUE OF



MOBILE COMPUTING MEGATEST

Thinking about a new notebook or handheld? Don't hit the shopping trail without consulting our exhaustive annual review of portables, Palms and Pocket PCs. Plus: we test the latest Bluetooth hardware and take you under the covers of the Tablet PC.



FINE-TUNE YOUR NOTEBOOK

Expert tips to help road warriors squeeze the most from Windows, Mac OS and Linux kick off another dose of real-world computing in our Workshop section.



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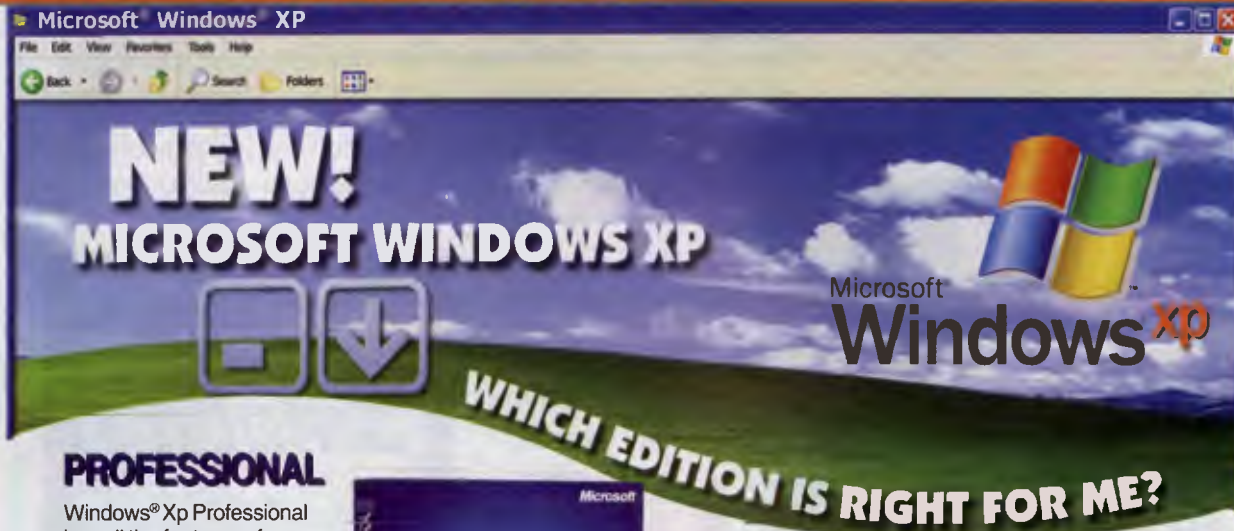
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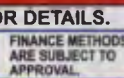
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2GB PC Card Hard Drive

Easily store and share information in a small and ultra portable device that is simple to use and easy to carry anywhere.

- 4200 rpm
- Max 20Mb/s transfer rate host
- Max 130Mb/s transfer rate disk
- Average 15ms seek time
- 256KB buffer size
- Compatible with any PC equipped with a Type II PCMCIA PC Card slot
- Support for Windows 95/98/XP/2000/NT
- 5mm x 54 mm x 85.6 mm
- Weighs only 55g



Rent* \$6.15/wk (D3427)

\$549

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5

TOSHIBA

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Tecra & Portégé Models

Portégé 4010 Series

Ultrathin, ultralight, ultraperformance

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
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*Delivery charges extra.

TOSHIBA Accessories

Portégé AC Adapter (D1209)

\$112

Portégé 256MB RAM (E2403)

\$265

Battery Pack for Portégé 4000 & Tecra 9000 Series (D1554)

\$137

Slim SelectBay HDD Adapter (D4120)

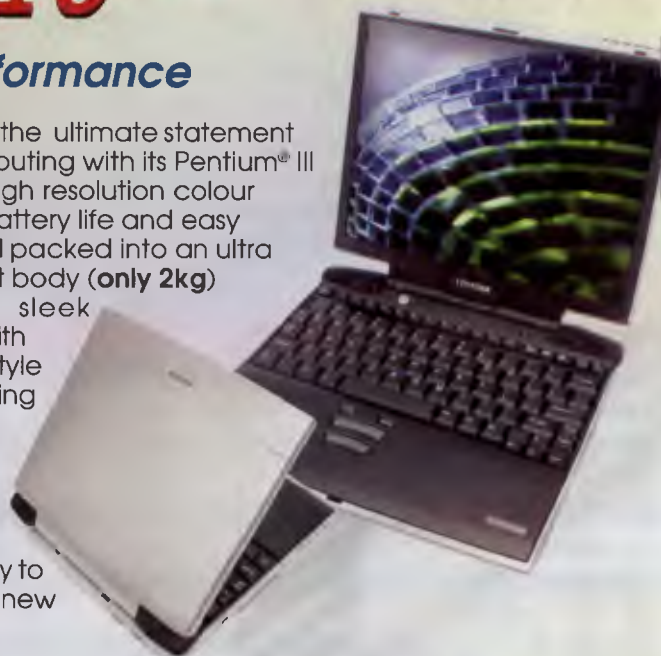
\$98

30GB HDD Drive Kit (D4104)

\$549

Portégé	4010-933
PROCESSOR	PIII 933MHz
RAM	256MB
HARD DRIVE	30GB
SCREEN	12.1" XGA
MAX RESOLUTION	1024 x 768
CD-ROM/DVD	DVD
PORT REPLICATOR	Optional
VIDEO RAM	16MB Ext
56k v.90	Yes
10/100 LAN	Yes
WIRELESS LAN	Yes
WEIGHT	1.9kg
WARRANTY	3 Years
Rent* /wk	\$45.72/wk (E3499)
WIN XP PRO/2000	
	\$4,955

The Portégé® is the ultimate statement in mobile computing with its Pentium® III power, large high resolution colour display, long battery life and easy functionality all packed into an ultra thin lightweight body (**only 2kg**) finished in sleek magnesium. With head turning style and work burning performance, the Portégé® is the perfect tool for the travelling executive ready to succeed in the new world.



Tecra 9100 Series

The most mobility & power without compromise!

The Tecra® series is equipped for constant mobile performance — providing you with the ultimate combination of traditional Tecra investment benefits, high processor performance and a new sleek look and feel that you will notice. Each Tecra comes with DVD drive standard.

For more details call Our Sales Team on 1300 13 9999 or visit www.ht.com.au/cat/toshiba

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6

Projectors TLP-B2 Ultra

This amazing compact projector has the profile of letter-size paper and weights only 2.6kg. That means you can carry it with one hand and take it anywhere you go.

FEATURES

Full Auto Scanning for plug-and-play hookup to any laptop or workstation, 1,250 ANSI lumens optical system, True XGA Resolution (1024x768).



The Toshiba 680/681 Projectors are flexible enough to deliver your presentations in style! The 681 model comes with a unique swivel and folding camera allowing projection of hard copy material. Both projectors share the following features:

Resolution: XGA 1,024x768,
Brightness: 1,500 ANSI Lumens,
Weight: 3.7 kg for 680 and 4.4 kg for the 681.

TLP-680
(without camera)

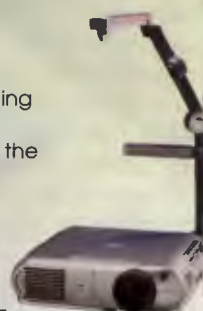
Rent* \$76.98/wk

(D1732) **\$8,649**

TLP-681
(with Camera)

Rent* \$87.51/wk

(D1733) **\$10,437**



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Notebooks

Compaq Presario 2800 Notebook

- Intel Mobile Pentium 4 Processor-M with Speedstep technology
 - Supersized 14.1" SXGA+ display
 - 256MB DDR RAM standard
 - 20GB hard drive
 - Removeable CD-RW drive
 - 3.5" 1.44MB diskette drive
 - 2 USB 2.0 Ports - 40x faster than USB 1.1
 - Optional Wireless or Bluetooth with multiport technology
 - Integrated Mini PCI 56K modem and 10/100 ethernet
 - Windows XP Home
- Includes 1 year return to base warranty

Pentium 4 1.4 GHz

Rent* \$38.78/wk

(F0230) **\$4,099**



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Presario
724AU, or
Presario
725AU

- 10 Bonus CD's +
- Storage
- "disc on key" +
- Optical mouse

• Available until 31st July 2002 or strictly while stocks last

Compaq Evo N800c Notebook Series

- Intel Mobile Pentium 4 1.7GHz-M processor
 - 15.0" CTFT 1024 x 768 Display, 256MB DDR SDRAM (266MHz)
 - ATI Mobility Radeon 7500 video chipset, 32MB DDR SDRAM, 4X AGP
 - 30GB Hard Disk Drive, optional 3.5" 1.44MB Diskette Drive
 - 8X DVD-ROM Drive
 - Integrated Mini PCI v.92/56K modem and NIC Combo
 - Windows XP Professional or Windows 2000
- Includes 3 year Limited International warranty

Intel Mobile Pentium 1.7 GHz M processor

Rent* \$53.86/wk

(F1052) Windows 2000

Or

(F1054) Windows XP

\$5,837

Compaq 3 Year Limited International Warranty, including pick-up anywhere in Australia, with a 48-hour service workshop turnaround repair time.



Compaq Evo N115 Notebook

- AMD Duron 1GHz or Athlon 1.2GHz processor
- 14.1" Colour TFT XGA display
- 128MB or 256MB SDRAM standard*
- 20GB hard drive and 1.44MB 3.5" diskette drive
- 24X CD-ROM or 8X DVD-ROM drive*
- Integrated Mini PCI 56K modem and 10/100 ethernet
- Windows XP Professional

Includes 1 year courier pick-up warranty

*Model Dependent

AMD Duron 1GHz

Rent* \$24.76/wk

(E1121) **\$2,495**

Athlon 1.2GHz

Rent* \$29.72/wk

(E1118) **\$2,995**

Compaq 1 Year Limited International Warranty, including pick-up anywhere in Australia, with a 48-hour service workshop turnaround repair time.



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Pocket PC & StorageWorks

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iPAQ 3800 Series Accessories

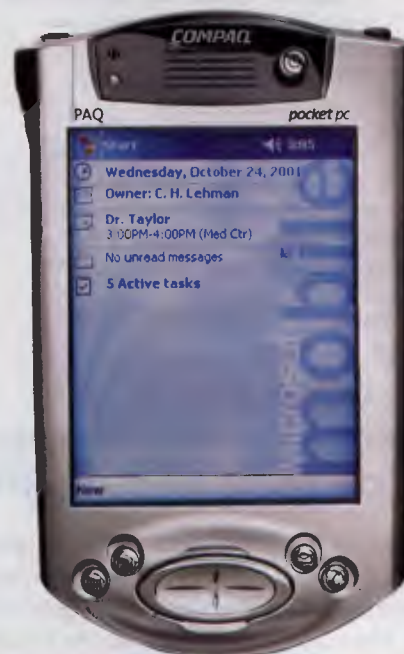
- Compaq Cover Pack (D9175) **\$45**
- Compaq Auto Adapter (D9174) **\$65**
- Compaq Stylus 3 pack (D9176) **\$35**
- Compaq Zippered Leather Case (E3569) **\$65**
- Compaq Universal Cable Serial/USB (D9171) **\$45**



Compaq iPAQ Pocket PC H3870

The No.1 Pocket PC now with inbuilt Bluetooth for wireless communication

- 206MHz Intel StrongARM Processor
- Memory: 64MB RAM, 32MB ROM
- Reflective TFT Screen with 65,536 colours. 240 x 320 resolution.
- Inbuilt Bluetooth for wireless link to Bluetooth mobile phones, printers and PCs.
- SD expansion slot integrated
- 1400 mAh Lithium Polymer rechargeable battery with up to 12 hours standby (depending on usage)
- Powered by Microsoft Pocket PC 2002.
- Includes: Universal (USB/Serial) Docking Cradle, AC Adaptor
- 2001 Planet PDA – Best Pocket PC: Compaq iPAQ 3800 series.



Rent* \$15.45/wk (D1796) **\$1,379**

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Compaq StorageWorks Network Attached Storage

The StorageWorks™ NAS S1000 by Compaq is the entry-level Network Attached Storage (NAS) solution that delivers quick and simple NAS storage providing multi-protocol file support and storage management for workgroups, small businesses and remote locations. The S1000 is designed as quick and simple storage that is easy to deploy and manage.

NAS S1000 320GB

- 320GB, 1U high • CIFS, NFS, Netware support • Windows Powered OS • Dual 10/100 NIC • Gig-E included • Celeron 566MHz • 384MB SDRAM • On board SCSI for backup

NAS S1000 640GB

- 640GB, 1U high • CIFS, NFS, Netware support
- Windows Powered OS • Dual 10/100 NIC • Gig-E included
- Pentium III 866MHz • 384MB SDRAM • On board SCSI for backup • Persistent Storage Manager for storage management



Rent* \$73.76/wk (E8205) **\$8,287**

Rent* \$96.35/wk (E8207) **\$11,886**

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hp e-PC Series

hp e-PC 40 Series*

small, silent, stylish

global, stable, flexible PCs to reduce lifecycle cost

Stable PCs designed to provide the best choice in configuration flexibility and performance. Innovative features and tools that let you reduce PC lifecycle cost through comprehensive deployment, management and support solutions.

the e-pc 40

- PC reinvented for lowest TCO: With the e-pc 40, HP has reinvented the desktop PC as a smaller, simpler, and more reliable device to further reduce total cost of ownership (TCO) and improve user comfort.
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- e-pc with Celeron™ processor: The e-pc 40 offers the Celeron processor, with integrated graphics and LAN interface in an ultra-small form factor.

P7266A

HP e-PC 40 C1.1 GHz
128MB 20GB(7200) CD

Windows XP Home
(E5837)

Rent* \$15.68/wk

\$1,399**

P7267A

HP e-PC 40 C1.1 GHz
128MB 20GB(7200) CD

Windows XP Pro

(E5856)

Rent* \$17.13/wk

\$1,529**

** Monitor Not Included
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hp e-PC e-PC 40* e-PC 42*

hp reference N° P7265A P7270A

PROCESSOR Cel 1.1GHz P4 1.8GHz

SD RAM 128Mb 256Mb

HARD DRIVE 20GB (7200) 20 GB (7200)

CD-ROM - yes

Monitor not included not included

Built-in LAN Yes yes

WARRANTY 1 Year 1 Year

WINDOWS XP HOME (E5827)

Rent* /wk \$14.89/wk

\$1,329**

WINDOWS XP PRO

Rent* /wk

(E5857)

\$23.71/wk

\$2,389**

hp e-PC 42*

professional

P7270A

Windows
XP Pro
included

(E5857)

** Monitor Not Included
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The e-pc 42 offers a Pentium 4 processor with integrated graphics and LAN in an ultra small form factor.

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Complete ProLiant Series Networking Solutions

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Compaq Services Carepak Upgrades:
Installation from (D6442) **\$300**
Sameday 4 hours responses warranty upgrade from (D6585) **\$439**
Microsoft Operating System Application Telephone Support Pack-10 (D6479) **\$1,750**
Pack-25 (D6480) **\$4,285**

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Compaq ProLiant ML 330 G2

The affordable Server for an Expanding Business!

- Delivers performance and data security at the best price.
- Ideal use with File/Print/Internet sharing, email & Small databases
- Dual processor capable Intel Pentium III 1266MHz with 133 MHz FSB
- 128MB ECC SDRAM (expandable to 4GB)
- 5 Available PCI expansion slots (includes 4 x 64 bit PCI slots)
- 40GB Ultra ATA-100 Hard Drive with Integrated ATA RAID or (Ultra3 SCSI and hot plug Hard Drive optional)
- Tower model kit available
- Includes Famous Insight Manager and SmartStart Software suites
- 1 year Compaq warranty, parts, labour, on site (ask about our upgrades)

Rent* \$21.85/wk (E6123) **\$1,950**

Small Business Budget Solution

PIII 1266MHz/ 40GB (ATA)/128MB Windows 2000 Server

Rent* \$33.70/wk (E6124)

\$3,396



Compaq ProLiant ML350 G2

The Workgroup server that will grow with your business!

- Delivers constant uptime and expandability for future growth.
- Dual Processor capable Intel Pentium III 1266MHz with 133 MHz FSB
- 128MB ECC SDRAM (expandable to 4GB)
- 6 Available PCI expansion slots (includes 5 x 64 bit PCI slots)
- Integrated dual-channel Ultra3 SCSI
- 6x 1" Hot-plug Hard drive bays (expandable to 8)
- Redundant Power supply optional
- Tower model kit available
- Includes Famous Insight Manager and SmartStart Software suites
- 3 Year Compaq Warranty, parts, labour, on site

Rent* \$33.69/wk (D4235) **\$3,395**

Business Work Group Solution

PIII 1266MHz/ 3x18GB/ Raid 5/256MB/Compaq 532 Raid Controller/ Windows 2000 Server

Rent* \$76.00/wk (E6125)

\$8,539



Compaq ProLiant ML 370 G2

For unprecedented performance and availability!

- Ensures constant uptime with Hot pluggable Hard drives, cooling fans, PCI slots, and also optional Hot Plug secondary power supply. The all-new Compaq online spare memory
- Dual Capable Pentium III 1400MHz with 512k cache & 133MHz FSB
- 256MB of 133MHz ECC SDRAM (expandable to 6GB)
- Integrated Dual Channel Ultra 3 SCSI Controller
- 6-1" Hot Plug Hard drive bays, 6 - 64bit PCI slots
- Includes Famous Insight Manager and SmartStart Software suites
- 3 Year Compaq Warranty, parts, labour, on site

Rent* \$50.28/wk (E3940) **\$5,449**

Corporate Solution

PIII 1400MHz/ 256 MB/ 3 x 18GB, RAID 5, Compaq 5i Raid Controller/ Windows 2000 Server

Rent* \$83.55/wk (E6159)

\$9,965



Compaq DLT Tape Drives

20/40GB DLT4000 Tape Drives

20GB native capacity and 40GB compressed (at 2:1)

20/40GB DLT4000 Internal

Rent* \$30.36/wk (89998)

\$3,059

20/40GB DLT4000 External

Rent* \$36.47/wk (87097)

\$3,675

40/80GB DLT8000 Tape Drives

40GB native capacity and 80GB compressed (at 2:1)

40/80GB DLT8000 Internal

Rent* \$47.97/wk (C9033)

\$5,199

40/80GB DLT8000 External

Rent* \$53.88/wk (C3886)

\$5,839

110/220GB SDLT Tape Drives

Maximum native storage capacity of 110GB and 220GB compressed

110/220GB SDLT Internal

Rent* \$86.32/wk (C4273)

\$10,295

110/220GB SDLT External

Rent* \$88.67/wk (E4517)

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hp procurve switch 5300xl Series

the new HP Procurve Switch 5300xl series wire-speed, layer 3 and layer 4 technology at layer 2 prices, making them your best-value layer 3 switches. The Switch 5300xl series combines cutting-edge technology with unparalleled investment protection. Smart, scalable, affordable, and easy to use in a compact, 4- or 8-slot mini-chassis, these convergence ready switches provide flexibility, high port density, free software upgrades, and a lifetime warranty.

J4349A hp procurve switch 5348xl

4-slot Layer 3 access switch, 36.6Gbps backplane, 24 mpps, pre-configured with 48 10/100 ports.

Rent* \$77.29/wk (E8120)

\$9,250**J4848A hp procurve switch 5372xl**

8-slot Layer 3 access switch, 76.8Gbps backplane, 48 mpps, pre-configured with 72 10/100 ports.

Rent* \$136.73/wk (E8121)

\$16,995

hp procurve switch 5348xl
hp procurve switch 5372xl

**NEW**

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hp procurve switch 408

Unmanaged 8 port 10/100 switch in a compact sized package. This switch offers half/full duplex, 10/100 autosensing on every port. Warranty: Lifetime, Exchange Next Day

(C9017)

\$385

hp procurve switch 2312 & 2324

Ideal for low-cost, unmanaged 10/100 connectivity
• Lowest Price 10/100 Switch • Includes 2 Built-in Gigabit transceiver slots • Brings 10/100/1000 solutions to the market • Media-flexible ports for uplinks and server connections • HP quality, functionality and performance • Plug and play solution

**procurve switch 2312**

12 port unmanaged switch)
Rent* \$10.97/wk (B0063)

\$979**procurve switch 2324**

24 port unmanaged switch)
Rent* \$15.56/wk (B0064)

\$1,389

hp procurve switch 2512 & 2524

9.6GB PS BACKPLANE & AUTO-MDIX • Lowest Price 10/100 Managed Switch • Provides a rich, layer 2 feature set • Includes 2 transceiver slots for upgrade to a gigabit • Auto MDIX on all 10/100 and 100/1000 ports • Lifetime warranty for as long as you own the product • Wire-speed performance on all ports • FREE HP TopTools Management Software included.

**procurve switch 2512**

12 port managed switch)
Rent* \$18.03/wk (A9703)

\$1,609**procurve switch 2524**

24 port managed switch)
Rent* \$22.95/wk (B0062)

\$2,048

hp server tc2100 Series

P5498A hp server tc 2110**P4 1.7GHz 18GB SCSI Model 18****Features**

- Intel Pentium 4 1.7GHz
- 128MB SDRAM
- 256KB L2 cache
- 48x CD-ROM
- 18GB Ultra3 SCSI HDD
- FDD, single-channel Ultra 3 SCSI controller
- 10/100TX LAN, 6 shelves
- 2 full-length PCI slots
- startup CD & toptools for servers

- Warranty: 3 year Next Day, Onsite



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Rent* \$33.07/wk

\$3,332

(E6980)

P5499A hp server tc 2110**P4 1.7GHz 40GB IDE Model 40****Features**

- Intel Pentium 4 1.7GHz,
- 128MB SDRAM
- 256KB L2 cache
- 48x CD-ROM
- 40GB Ultra ATA IDE HDD,
- FDD, dual-channel UATA/ 33/66/100 IDE controller
- 10/100TX LAN, 6 shelves
- 3 full-length PCI slots
- startup CD & toptools for servers

- Warranty: 3 year Next Day, Onsite



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Rent* \$25.33/wk

\$2,553

(E6978)

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Monitors, CD-R/RW/DVD, Media, Back-Up Kits, and Cameras

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4.7GB 5 Pack (E4498)

\$79

4.7GB Single (F1256)

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4.7GB 5 pack (E4499)

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4.7GB Single (F1257)

\$30



4.7GB 5 pack (E4501)

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4.7GB Single (F1258)

\$28

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LCD Monitors

Monitors include Sony 3 Year Warranty.

SDMS51

- 15" XGA Display
- Removable Stand
- 300:1 Contrast Ratio
- Fine 0.297mm Pixel Pitch
- Maximum Resolution: 1024 x 768 @75Hz
- Viewing Angle: Horizontal: 120, Vertical 90
- VGA Input
- 6 On-screen Display Language Choices

Rent* \$12.31/wk (E7756) **\$1,099**

SDMS81 (pictured)

- 18" SXGA Display
- Removable Stand
- 400:1 Contrast Ratio
- Fine 0.279mm Pixel Pitch
- Maximum Resolution: 1280 x 1024 @85Hz
- Viewing Angle: Horizontal: 160, Vertical 160
- VGA Input
- 22 Preset Resolutions

Rent* \$29.46/wk (E7757) **\$2,969**



Digital Still Cameras

DSCP31 - 2.0 Mega Pixel, 3X Digital Zoom, 1.6" LCD Screen, MPEG Movie HQX, Clip Motion, NiMH Battery System, USB.

Rent* \$6.89/wk (F1093) **\$615**

DSCP51 (pictured) - 2.1 Mega Pixel, 2x Optical, 6x Precision Digital Zoom, MPEG Movie HQX, E-Mail Mode, Intelligent Flash (Red-Eye Reduction), White Balance (Auto, Daylight, Cloudy), USB Interface

Rent* \$8.23/wk (F1233) **\$735**

DSCP9 - 4.0 Mega Pixel, 3X Optical (6X Digital) Zoom, 1.5" LCD Screen, Optical Viewfinder, ISO Sensitivity Setting, MPEG Movie HQX, USB.

Rent* \$17.09/wk (F1094) **\$1,525**

MVCFD100 - Accepts Floppy Disk and Memory Stick, 1.2 Mega Pixel, 3X Optical (6X Digital) Zoom, 2.5" LCD Screen, MPEG Movie Mode, E-mail, Text & TIFF Mode, USB.

Rent* \$12.31/wk (E1024) **\$1,099**



CD-RW & CD-RW/DVD Drives



All Kits supplied with: Burning Software for Win 98, 2K, Me & XP, I/F cable, Mounting screws, Easy install guide and Interactive User Manual



CRX195A1 - 40x Write / 12x Re-Write / 48x Read, Anti-Buffer-Under-Run technology, One Touch Turbo Boost

(E9864) **\$349**

CRX 1750MU - 24x Write / 10x Re-Write / 40x Read, Memory Stick slot, External USB2 interface.

(E4591) **\$495**

CRX 85AA1 (pictured) - 20x Write / 8x Re-Write / 24x Read / 8x DVD Ultra Portable Combo Drive PCMCIA interface.

Rent* \$8.73/wk (E1021) **\$779**

CRX 185A1C1 - 32x Write / 10x Re-Write / 40x Read, Anti-Buffer-Under-Run technology, VAS Vibration Reduction.

(E4592) **\$269**

CRX 175MC1 - 24x Write / 10x Re-Write / 40x Read, Memory Stick slot, Internal IDE interface.

(C9879) **\$299**

CRX85UA2 - 20x Write / 8x Re-Write / 24x Read / 8x DVD, Ultra Portable Combo Drive, USB2 interface.

Rent* \$8.73/wk (E1022) **\$779**

DVD+RW Writer

DRX120L (pictured) - External CD & DVD Burner Records upto 4.7GB, Burning: 2.4x DVD+RW / 12x CD-R / 10x CD-RW, Playback: 8x DVD, 32x CD, i.LINK/IEEE1394 interface.

Rent* \$15.45/wk (E4597) **\$1,379**

DRU120A - Internal CD & DVD Burner, Records upto 4.7GB, Burning: 2.4x DVD+RW / 12x CD-R / 10x CD-RW, Playback: 8x DVD, 32x CD, IDE interface.

Rent* \$12.65/wk (E4596) **\$1,129**



USB Storage Device

Plugs directly into a USB Port, Plug and Play interface, Security Zone software allows password protection of data, when using Win2K and Win XP.

USM16 - 16MB RAM (E4136) **\$99**

USM32 - 32MB RAM (E4140) **\$139**

USM64 - 64MB RAM (E4141) **\$199**

USM128 - 128MB RAM (E4142) **\$289**



CD-R Media

700MB / 80Min, 32x - 1x Compatible

10 Pack - Standard Jewel Case (E1040) **\$15**

10 Pack Slim - Jewel Case (E1041) **\$13**

25 Pack Spindle - (E1043) **\$29**

50 Pack Spindle (pictured) (E1045) **\$54**



SONY

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Introducing SONY's PDA Device with Built-in Camera

CLiÉ

The ultimate in handheld convergence - Stylish and powerful for mobile entertainment and business.

- Flip & Rotatable LCD Display
- Built-in Camera
- Keyboard embedded in PDA

- MP3 ATRAC 3 Audio Player
- Magnesium Alloy Finish
- Magicgate Memory Stick Slot
- 320 x 480 colour display
- Infra-red Interface
- Jog Dial
- Palm OS v4.1
- 16MB RAM
- USB Connectivity
- World Alarm Clock
- Remote Commander

Rotatable LCD Screen



Rent* \$15.12/wk (F0918)

\$1,349

MAGICGATE



Audio Player Supplied

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Collect 5,000 Bonus Fly Buys points when you purchase F0918 between 20/06/02 - 31/07/02

PCGC1MT

- | | |
|-------------------------------|-------------------------|
| • Crusoe Processor 733MHz | • Internal 56kbps Modem |
| • Windows XP Home Edition | • 8.9" SXGA Display |
| • MagicGate Memory Stick Slot | • 128MB RAM |
| • i.LINK (IEEE1394) interface | • 20GB HDD |
| • USB & PCMCIA interface | • Built-in Camera |

Port Replicator supplied with PCGC1MT

Includes: AV In/Out Connector, Monitor Connector, Network Connector, USB Connector



Rent* \$37.83/wk (E2395)

\$3,999

Memory Stick

Sony's tiny Memory Stick lets you enjoy seamless recording, transfer, storage and playback of audiovisual and other data, through a wide range of Memory Stick compatible products.

16MB (86779) **\$69**
32MB (88654) **\$99**
64MB (88648) **\$129**
128MB (C5887) **\$245**

DVD ROM

COMPACT disc
Recordable ReWritable



PCGFX950

- | | |
|----------------------------|-----------------------------|
| • Intel Celeron 900MHz | • 256MB RAM |
| • CD-RW / DVD Combo Drive | • 20GB HDD |
| • Floppy Disk Drive | • Modem & Network Interface |
| • Windows® XP Home Edition | • Video Out Connector |
| • 14.1" XGA Screen | • USB & i.LINK interface |

Rent* \$29.76/wk (E0996)

\$2,999

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Ipex- Largest Australian PC maker!

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Ipex have a full range of Windows® XP ready PCs. Take advantage of Microsoft's new Operating system with a new PC from Ipex. Choose from Windows® XP Home or Professional Editions for home or business.

Monitor not included



Internet keyboard optional upgrade

Ipex PCs use genuine Microsoft® Windows® www.microsoft.com/piracy/howtotell

IPEX FOR HOME

Form Factor	T400 Tower	T400 Tower
Processor	Intel® Celeron® 1.8GHz	Intel® Pentium® 4 2.2 GHz
HDD	40GB @ 7200RPM	80GB @ 7200RPM
RAM	256MB DDR	256MB DDR
LAN	Onboard	Onboard
Video	Onboard	64MB
Sound	SB Live	SB Live
CD-ROM	CD-RW	DVD-Rom/ CD-RW
Modem	None	None
Monitor	Choose below	Choose below
Warranty	3 Years RTB	3 Years RTB
OS	Win XP Home	Win XP Pro
Software	Works 6.0	OfficeXP SBE
Parts	(F1236)	(F1237)
	\$1,499	\$2,749
Rent*	\$16.80/wk	\$27.28/wk

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The figures quoted are based on a per week basis over 3 years. T.A.P. Terms & Conditions apply.



The Ipex Series Slim Office Desktop is ideal for business and corporate environments. Housed in a small form factor Slim Office Case and featuring Integrated LAN, Graphics and Audio onboard.

IPEX FOR BUSINESS

Form Factor	Slim office	Slim office	Micro office
Processor	Intel® Celeron® 1.4 GHz	Intel® Celeron® 1.7GHz	Intel® Pentium® 4 2.0 GHz
HDD	20 GB @ 7200RPM	20 GB @ 7200RPM	20 GB @ 7200RPM
RAM	128 MB SDRAM	128 MB DDR	128 MB DDR
LAN	Onboard	Onboard	Onboard
Video	Onboard	Onboard	32MB Integrated
Sound	Onboard	Onboard	Onboard
CD-ROM	CD-ROM	CD-ROM	CD-ROM
Monitor	15" CRT	15" CRT	17" CRT
Warranty	3 Years RTB	3 Years RTB	3 Years RTB
OS	Win XP Pro	Win XP Pro	Win XP Pro
Software	none	Office XP SBE	Office XP SBE
Part #	(F1238)	(F1239)	(F1240)
	\$1,589	\$2,039	\$2,369
Rent*	\$17.81/wk	\$22.85/wk	\$23.51/wk

Upgrade your IPEX PC to the following Microsoft software suites

Microsoft Works Suite 2002

- Word 2002 • Encarta Standard 2002
- Money 2002 • Picture It! Photo 2002

Microsoft Office XP Small Business Edition

- Word 2002 • Excel 2002 • Outlook 2002
- Publisher 2002

Microsoft Office XP Pro

- Word 2002 • Excel 2002 • Outlook 2002
- Publisher 2002 • Access 2002

Call Harris Technology on 1300 13 9999 for more information

IPEX CRT & LCD FLAT SCREEN MONITORS

IPEX 15" CRT



(C5931)

\$315

17" CRT

(D9301)

\$329

IPEX 15" LCD



(C9400)

\$949

Rent*\$10.63/wk

IPEX 17" LCD



(C9401)

\$1,399

Rent*\$15.68/wk

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Iplex- NEW Notebooks & Servers

Iplex - ASUS L2000 Series Notebook

The Iplex-ASUS L2000 Notebook combines the processing power of the Mobile Intel® Pentium® 4 processor with the Intel® 845 MP chipset to boost application performance and deliver outstanding graphics capabilities. The L2000 notebook is the ideal desktop PC replacement.

Features:

- New generation Mobile Intel® Pentium® 4 processor combined with a Mobile Intel® 845 chipset delivers enhanced processing power to meet the most demanding business requirements.
- Up to 1GB DDR memory support provides the necessary bandwidth and capacity for graphics and processor- challenging applications.

- ATI Radeon 7500 video chipset provides a complete, dedicated graphics solution with revolutionary performance.
- 16MB of 128bit dedicated DDR memory.
- Powerplay™ power management technology optimises graphics powerconsumption to improve battery life.
- Microsoft® Windows® Extended Desktop supports large screen display.



IPEX NOTEBOOKS

Model	M2400	L2000B
Processor	Intel® Celeron® -M 1.13 Ghz	Intel® Pentium®4-M 1.6 Ghz
HDD	20 GB	20GB
RAM	128 MB	128 MB DDR
LAN	10/100 Ethernet	10/100 Ethernet
Sound	Onboard	Onboard
CD-ROM/DVD	yes	yes
Modem	Inbuilt V.90 56k	Inbuilt V.90 56k
Port Replicator	Optional	Optional
Video RAM	upto 32 MB	16MB DDR
Screen	14.1 XGA LCD	14.1 XGA LCD
Resolution	1024 x 768	1024 x 768
Warranty	2 years RTB	2 years RTB
OS	Win XP Pro	Win XP Pro
Parts	image not shown (E7417) \$3,199	(E7416) \$3,449
Rent*	\$31.75/wk	\$34.23/wk

Iplex PCs use genuine Microsoft® Windows® www.microsoft.com/piracy/howtotell

IPEX- RACK MOUNT SERVERS

Model	C220 1U	C460 2U
Form Factor	1U Rack Mount	2U Rack Mount
Processor	C220RM 1U Server PIII 1 Ghz (Dual Capable)	C460-RM-T 2U Server PIII 1.26 Ghz (Dual Capable)
HDD	18GB SCSI U160 HDD	18GB SCSI U160 HDD
RAM	128 MB SDRAM	256 MB SDRAM
Lan	Dual 10/100 Ethernet	Dual 10/100 Ethernet
Video	Onboard	Onboard
Sound	Onboard	Onboard
CD	CDROM	CDROM
SCSI/RAID	Dual Channel U160 SCSI Ctrl	Dual Channel U160 SCSI Ctrl
Warranty	3 years Onsite	3 years Onsite
OS	Win 2000 Server + 5 CALS	Win 2000 Server + 5 CALS
Parts	(E8107) \$5,050	(E8108) \$5,745
Rent*	\$46.60/wk	\$53.01/wk

(E8107)



Iplex C220 1U

(E8108)



Iplex C460 2U

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Officeworks

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Technology Centre Shoppers! Not all products are in-store, but consulting & advice available on all items.

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www.ht.com.au

Quantum's New SuperLoader Data Storage

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SuperLoader

- DLT1 - 640GB capacity @ 3MB/sec transfer rate
- SDLT - 1.76TB capacity @ 11MB/sec transfer rate (above are native figures. 2:1 compression is achievable)
- Choice of drives for value or performance
- Huge performance/capacity upgrade path
- Single cartridge mailslot allows removal of cartridges without system interruption
- Web based management tools allows control and monitoring from remote location
- Optional barcode reader for non-sequential tape management
- 1 million MCBF



Rent* \$134.56/wk DLT1 (F1234)

Rent* \$217.18/wk SDLT (F1235)

\$16,725
\$26,995

The new Quantum SuperLoader™ quickly stores up to 3.5TB in only 2U. It also features up to 16 DLTape™ cartridges, sophisticated on board remote management tools and convenient ways to import and export cartridges. For more information, visit www.quantum.com/superloader

MONSTROUS CAPACITY

Tiny Footprint

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HARRIS TECHNOLOGY
for all your computer needs!

The Broadest Line-up of Network Attached Storage

Snap Server 4100

- 480GB, 320GB or 240GB of Network Attached Storage (NAS) • 5-minute installation • High-density 1U format fits standard 19" racks or easily stacks on tabletops • RAID 5, 1, 0 • Automatically recognises and supports all major network platforms • 100Base-TX/ 10Base-T Ethernet connectivity • SNMP support for centralised management (can also be managed remotely via Web browser) • Very low total cost of ownership (TCO).



400GB Rent* \$70.79/wk (D1207) **\$7,953**

240GB Rent* \$55.51/wk (A8119) **\$6,015**

480GB Rent* \$77.68/wk (F1231) **\$9,265**

Snap Server 1100

- 80GB or 40GB of Network Attached Storage (NAS) • Five minute installation • Compact, portable easily fits in a briefcase, on a shelf or on a tabletop • Automatically recognises and supports all major network platforms • 100Base-TX/10Base-T Ethernet connectivity • SNMP support for centralised management (can also be managed remotely via Web browser) • Very low total cost of ownership (TCO).



40GB Rent* \$17.54/wk (E4199) **\$1,565**

80GB Rent* \$22.81/wk (E4200) **\$2,299**

The Guardian

- 1.44 TB capacity, twelve hot swappable disk drives • Simple, seamless integration: simultaneous support for mixed Windows, UNIX, Linux environments, as well as HTTP and FTP support • High data availability via RAID 5, hot-swappable disk drives and dual Gigabit Ethernet network interface with failover capability • High system availability from redundant, hot-swappable power supplies and cooling fans and UPS support • Easy, flexible management with support for Microsoft Active Directory Service (ADS), UNIX Network Information Service (NIS), SNMP, quotas and environmental monitoring tools • Fast, sure data protection via Snapshot technology, backup agent support and PowerQuest DataKeeper software for automatic Windows client backup.



(F1232) **\$57,349**

Snap Server 12000

- 960GB of Network Attached Storage (NAS) • Less than a 15-minute installation • Compact 3U rack-mountable form factor • Hot-swappable drives • Dual redundant hot-swappable power supplies and cooling fans • RAID 5, 1, 0 • Automatically recognises and supports all major network platforms • Gigabit/100Base-TX/10Base-T Ethernet connectivity • SNMP support for centralised management • Very low total cost of ownership (TCO)



960GB (C9169) **\$33,640**

Snap Server 2200

- 160GB of Network Attached Storage (NAS) • Five minute installation • Compact, stand alone unit easily fits on a shelf or tabletop • RAID 1, 0 • Automatically recognises and supports all major network platforms • 100Base-TX/10Base-T Ethernet connectivity • SNMP support for centralised management (can also be managed remotely via a Web browser) • Very low total cost of ownership (TCO) • Network UPS support.



Rent* \$37.30/wk (D1208) **\$3,759**

Power Back Up = Power Protection

APC Back-UPS ES 350/500

The new APC Back-UPS ES 350/500 is designed as an Affordable Battery Backup to provide continued uptime and hardware protection for home and home office computer users. This product has five Australian style outlets (three battery and surge, two surge only outlets); new attractive flat design; phone, modem, fax and DSL data line surge protection; computer interface port for USB communications, ships with file saving, auto-shutdown software offers cord management feature. The core application for the APC Back-UPS ES is the standalone desktop in the home environment or home office in countries using Australian plug style.

New line of UPS family comes with 2 years product warranty..



Back-UPS ES 350va (E1093) **\$185** Back-UPS ES 500va (E0709) **\$235**

APC Back UPS Pro® for Workstations

Smart battery backup & high performance surge suppression for Windows 95 & NT PCs

- PowerChute® Plus software lets your UPS shut down your applications gracefully in the event of an extended power failure
- Additional outlet for protection of printers
- Audible alarms
- Phone/modem protection
- User replaceable, hot swappable batteries

APC Back-UPS Pro 280si (76636) **\$259**

APC Back-UPS Pro 420si (76637) **\$355** APC Back-UPS Pro 650si (76638) **\$485**



APC Smart-UPS with USB Support

Smart-UPS 1000v, 1500v

Smart-UPS protects your data by supplying network-grade battery backup when power fails. With PowerChute® plus software the uninterruptible power supply (UPS) will safely store data and shut down your network operating system before the battery is fully discharged, whether you're there or not. SmartSlot internal accessory slot allows you to install optional accessories to enhance the performance of your UPS. APC Smart-UPS is the perfect UPS for file servers, minicomputers, UNIX CPU's, internet hubs, telecommunications systems and other mission-critical applications.

APC Smart-UPS 1000v Rent* \$11.04/wk (D9337) **\$985**

APC Smart-UPS 1500v Rent* \$14.56/wk (D4218) **\$1,299**

APCNetShelter VX Black 42U Premium Equipment Enclosure

Next generation, high quality enclosure solutions designed to meet the needs of today's and tomorrow's networking environment.

Adjustable mounting depth, Casters, Cold rolled steel, Computer grade ventilation, Leveling feet, Lockable doors and side panels, Powder coat, Removeable doors and side panels, Rolls through 7 ft door, Roof and base cable access, Ships fully assembled, Equipment mounting hardware, Keys, Leveling feet, Side panels, User Manual.

Rent* \$31.05/wk (E4994) **\$3,129**



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PNote Pro (99592)

\$45



Surge Arrest 5 Strip (A0098)

\$55



APC Symmetra
Power Array
8kVA, exp. to
16kVA
(71087)
Rent*

\$113.44/wk

\$13,995

So good we use it ourselves!

Outstanding Performance & Reliability

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Maxtor DiamondMax D540X

Drives offer outstanding capacity, reliability and value. They feature up to 160 gigabytes of data storage and Ultra ATA/133 data transfer performance.

120GB (E0564) **\$419**

160GB Rent* \$7.79/wk (E0565) **\$695**



DiamondMax D540X

Maxtor DiamondMax Plus D740X

For power users in e-commerce, online gaming, and MP3, Maxtor DiamondMax Plus D740X hard disk drives set the industry standard for capacity, performance and acoustics.

20GB (E0566) **\$189**

40GB (D8030) **\$199**

60GB (E0567) **\$245**

80GB (F0611) **\$289**



DiamondMaxPlus D740X

Maxtor Atlas™ 10K III

Disk Drives provide outstanding performance for data-intensive storage environments, with a 10,000 RPM rotational speed and a 4.5 millisecond (ms) seek time. They feature the high speed, industry-leading Ultra160 SCSI interface—and Maxtor's Shock Protection System III (SPS III) for superior shock durability and reliability.

36.7GB Rent* \$7.38/wk (D4615) **\$659**

73GB Rent* \$16.64/wk (D5940) **\$1,485**



Atlas 10K III

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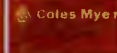
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Make Movies at Home - Easy!



Maxtor®

Maxtor DV Producer™ is one of the easiest ways to turn your home videos into Hollywood-style movies. Regardless of your skill level, the flexible, easy-to-use software will let your creativity soar with artistic templates, realistic special effects, professional transitions and titling, and multiple audio tracks. Everything you need is included in this kit: A. Maxtor FireWire™ (1394/i.LINK™) card, B. Camcorder cable, C. ArcSoft™ ShowBiz™ video editing software. Make spectacular movies in three easy steps:

Making Movies Like a Professional!

Designed for beginning and advanced users. Windows® Compatible

FEATURES:

- Easy editing software
- Add special effects
- Easy installation
- Complete kit

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Now you're making movies like a professional!

A. FIREWIRE CARD

B. CABLE

C. SOFTWARE

***DV Producer**

(E4197)

\$179

Maxtor Personal Storage

FireWire

FireWire

USB 2



Maxtor Personal Storage 3000DV/80GB
Ideal for speed-intensive applications such as editing digital video, playing games, and listening to music. The 3000DV features the Maxtor award-winning 7200 RPM hard drive—up to 56% faster than 5400RPM external hard drives.

Rent* \$9.86/wk

80GB (E4068) **\$880**

Maxtor External Storage 160GB/3000XT
With the highest capacity maxtor offers, this is the perfect external storage solution for today's storage-hungry digital entertainment equipment. Run applications, edit videos, listen to music, download files, or play games, or store all your important documents and precious memories.

Rent* \$11.04/wk

160GB (E4067) **\$985**

Maxtor Personal Storage 3000LE/40GB/120GB
Instantly add storage for your digital photos, videos, MP3 songs, games, and important electronic files. The USB 2.0 interface is up to 40 times faster than USB 1.1. The 3000LE is compatible with virtually all existing USB ports—offering connectivity for today's systems and speed for tomorrow's technology.

40GB (E4064) **\$489**

Rent* \$8.39/wk 120GB (E4065) **\$749**

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Next Generation Backup Solutions

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MEDIA

DLT Tape Media IIIXT 15/30GB Tape (68362)	\$80
DLT Tape IV Media 20/80GB (71231)	\$140
DLT Cleaning Tapes (97851)	\$80
Super DLT Media 110/220 GB (B9825)	\$243
Exatape 112 - 8mm (C1976)	\$12
Exatape 160 - 8mm (C1980)	\$22
Exatape AME - 125m (C1986)	\$102
Exatape AME- 170m (77600)	\$140
Exatape AME 2-150m (C1989)	\$156
Exatape 8mm Cleaning Tape (C1982)	\$29
Exatape AME 18c Cleaning Tape (C1983)	\$35
Exabyte VXA1 - V6 12/24 GB (91103)	\$72
Exabyte VXA1 - V10 20/40 GB (C3945)	\$99
Exabyte VXA1 - V17 33/66 GB (91105)	\$184
Exabyte VXA1 - 1m Cleaning Tape (91104)	\$72
LTO Ultrium 100/200 GB Tape (D1500)	\$298

DLT & LTO TAPE DRIVES



DLT1 economy tape Internal Drives	Rent* \$27.69/wk (88037)	\$2,790
DLT1 economy tape External Drives	Rent* \$30.75/wk (88038)	\$3,099
DLT8000/S Internal 40/80GB	Rent* \$53.66/wk (82501)	\$5,815
DLT8000/ST External 40/80GB	Rent* \$59.23/wk (82502)	\$6,419
SDLT220/S Internal 110/220GB	Rent* \$88.28/wk (B9821)	\$10,529
SDLT220/ST External 110/220GB	Rent* \$91.15/wk (B9823)	\$11,245
LTO Ultrium Internal 100/200 GB	Rent* \$86.48/wk (D1509)	\$10,350
LTO Ultrium External 100/200 GB	Rent* \$92.19/wk (D1508)	\$10,995



iPrism Internet Filter Appliance

- Dedicated system filters internet traffic continuously
- Over 65 categories updated automatically every 24 Hrs.
- Limits legal liability of unauthorised site access
- Excellent for Schools, Corporates, Government.
- Plug and Play, no extra hardware needed.
- Helps restore network /internet bandwidth
- Increases employee productivity

50 user licence: Rent* \$90.60/wk (E3950) **\$10,805**

TapeWare

BACKUP SOFTWARE

Backup for NT, Netware or Linux
TapeWare - Loaded with features yet simple to use. TapeWare is simple to install and easy to administer whether you have a single PC or a large enterprise network.

- Quick Start Wizards set up common applications quickly
- Advanced and predefined scheduling features
- Built in free 9 slot autoloader support
- Desktop, Single Server, Enterprise & Data Center Versions
- Options for MS-Exchange, Cluster, SQL, etc.

TapeWare Lite for Windows

Single Server Licence: Rent* \$6.98/wk (E1612) **\$623**



VXA

EXABYTE VXA-1 TAPE DRIVE

- 12/24, 20/40, 33/66 Gbyte capacity tapes
- 3-6MB sec sustained, that's 21.6GB/Hr
- IDE, Firewire and LVD models available.
- Retrospect or Tapeware Bundles available.

VXA 1 TAPE DRIVE

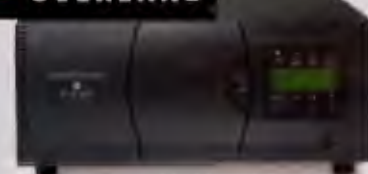
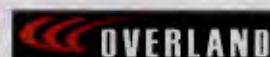
Internal	Rent* \$21.24/wk (C1847)	\$1,895
External	Rent* \$24.76/wk (C1915)	\$2,495
External Firewire Kit	Rent* \$27.74/wk (B1856)	\$2,795

EXABYTE MAMMOTH 1 TAPE DRIVE

Industry standard backup: External 20/40GB capacity
Rent* \$61.10/wk (E1609) **\$6,865**

EXABYTE MAMMOTH 2 TAPE DRIVE

High capacity and speed: External 60/150GB capacity
Rent* \$100.26/wk (E1610) **\$12,369**



*Super DLT, DLT8000 and LTO models also available

DLT1 AUTOLOADER

- 400 GB native, 800 GB compressed capacity
- DLT1 Single Tape Drive included
- 10 tape capacity
- Overland DLT reliability
- LVD 68 pin SCSI interface
- Includes 1 data tape and cable
- 20 GB/Hr throughput.
- 3 year factory warranty
- Optional On-site warranty.

Rent* \$82.94/wk (A0476) **\$9,892**

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PLEXTOR[®]

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for comfortable & relaxing digital life



CD/DVD

Features

- **High Speed DVD Reading**

Maximum 12x DVD Reading supporting DVD single/dual layer, DVD-R and DVD-RW (Ver. 1.0 & 1.1)

- **New Writing Strategy- VARI-REC**

"VarRec" can change the writing laser power at 1x & 4x CD-R CD-DA write speed. The function will provide the "Play-mind" for the expert users.

- **POWERREC-II. (Plextor Optimised Writing Error Reduction Control II)**

PX-320A contains a substantial database to determine the appropriate Write Strategy. This feature enables the drive to successfully burn a disc using a high performance servo even though the disc media might contain some imperfections.

- **Zone CLV (Zoned Constant Linear Velocity)**

PX-320A divides the recordable area of the media into 2 zones and writes each zone with best speed and optimized laser power for a higher quality written disc with PowerRec-II.

- **BURN-Proof. (Buffer Under Run-Error Proof) technology**

- New black tray reduces the writing jitter and burns a high quality disc.

- Ultra DMA Support

- Wide CD-R and CD-RW Media Compatibility

(F0771) **\$525**

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Portable For Notebooks & PC's 8/8/24 USB

PLEXTOR[®]



It's the first-ever portable slim CD-RW drive from Plextor with 8 Speed writing and 8 Speed rewriting by full CLV technology with "BURN-Proof" and 24 speed reliable reading. The PX-88TU features USB 2.0 interface (maximum transfer rate of 480Mbps). The PX-88TU's unique see-through window enables easy identification of the disc inside the drive for both 12 and 8cm discs. All Plextor drives are supplied with:

- MVP 2000 Create a digital jukebox and customized play lists, Record audio CDs from the playlist on CDR, Automated internet access to the CDDB database supplies album, song and artist information.
- Audio FS – allows for Drag & Drop access to any CD-Audio track as if they were .WAV files.
- Audio Capture 2000 - Drag & Drop tracks from standard audio CDs
- Plextor Manager 2000 utility software
- Disc Dupe 2000 – Duplicate your own CDs

Rent* \$8.04/wk (D0372)

\$718

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SCRIBE

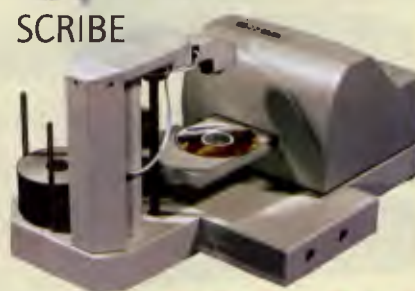
MediaFORM's latest product entry, provides an affordable desktop CD-R or DVD-R duplication and/or printing solution — all in a single footprint. As the most versatile duplication system on the market today, SCRIBE offers endless possibilities to automate CD-R or DVD-R duplication and/or printing. The base unit serves as a duplicator, print station or as a fully integrated duplication and printing system; allowing you to choose drive and print types within one simple-to-use design — ultimately reducing the overall total cost of ownership.

Choose from three standard system configurations: 1) CD-R, 2) DVD-R, or 3) print station only. Any of the system configurations are designed to accommodate thermal and/or inkjet printers.

Plus, the SCRIBE is business card and mini-disc compatible, which further maximises your investment. Not only will the SCRIBE record on business card CD-Rs but it also prints on all media by utilising the SCRIBE Business Card Template Kit. There's nothing else quite like it! the CD-R version includes MediaFORM's exclusive SmartDRIVE, providing intellectual property safeguards coupled with professional audio features.

MediaFORM SMART TECHNOLOGY[™]

SCRIBE



Rent* \$60.52/wk (E3761)

\$6,799

RENTSMART

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Belkin Surge & UPS

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Surge Cube

The SurgeCube™ allows electronic device to be protected from over voltages.

(D5966)

\$25

Master Cube



The Belkin MasterCube™ protects electronic device and one phone line from over voltages.

(D5956)

\$35

Cases



EON Laptop Case - Silver

(F0822)

\$89



Executive Leather Case

(F0827)

\$259



Aeropack

(F0824)

\$108

UPS SERIES

Regulator PRO Silver Series



Features:

- 2 Year Unlimited Product Warranty
- 175 Joule Energy Rating
- 3 Battery Back Up/ Surge Sockets
- 1 Surge Protection Only Socket
- Power Management Software Included
- 1.8m Power Cord
- Telephone/Fax/Modem and UTP (RJ45) Protection
- 1.83m Telephone Cable
- RS-232 Communication Cable
- EMI/RFI Filtration

350VA

F6C350zSER-SB
(192 Watts)

(C9277)

\$189

500VA

F6C500zSER-SB
(300 Watts)

(C9278)

\$249

650VA

F6C650zSER-SB
(360Watts)

(C9279)

\$329

Surge control is important because even small surges or spikes can eventually destroy or affect the performance of expensive electronic equipment such as a computer, phone, fax, TV, VCR, stereo or microwave. Damage can occur either instantaneously or over time as smaller surges cause the gradual deterioration of internal circuitry, to voltage fluctuations.

No Hassle Warranties Belkin offer the best Connected Equipment warranties in the business. Full warranty protection means your equipment is insured against damage due to power disturbances of all kinds - surges, spikes, even lightning strikes.

Connected Equipment Warranty up to \$25,000.

Home Office Range



F5C205z2

Belkin's SurgeMaster line has been designed to protect entry-level computers, dot matrix printers, personal copiers and all other sensitive electronics in the home or office.

Telephone/fax/modem protection

Sockets

Special Bundle

Purchase this SurgeMaster and get a Free Single Surge Cube worth \$25

(C4601) **\$79**

Connected Equipment Warranty up to \$50,000.

Superior Grade



F5C206z2

Pentium III computers, audio/video equipment and office equipment need extra protection.

• 6-way Superior Grade range

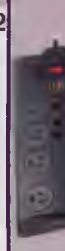
Blocked space adapters

AC Line protection

(C4604) **\$105**

Connected Equipment Warranty up to \$80,000.

Maximum Grade



F5C208z2

Maximum Grade series ideal for business computers, ADSL and cable modems, high-end printers and copiers, and sensitive audio/video equipment such as satellite receivers and home cinema systems.

39,000 Amps of AC protection

(C4607) **\$135**

Belkin - KVM Switches

KVM Switches

Over One Million Belkin KVM units sold World wide!



F1DB102P

Economy 2 Port KVM Switch - P/S 2

(D3162) **\$84**



F1DB104P

Economy 4 Port KVM Switch - P/S 2

(D3159) **\$175**



F1DS102P

SoHo 2 Port KVM Switch - P/S 2

(D3163) **\$289**

F1DS104P

SoHo 4 Port KVM Switch - P/S 2

(D3166) **\$369**

F1DS102T

SoHo 2 Port KVM Switch - P/S 2 & USB

(D3165) **\$299**

F1DS104T

SoHo 4 Port KVM Switch - P/S 2 & USB

(D3167) **\$385**



F1DA104Tz

Pro 2 4-Port KVM Switch - P/S 2 & USB

Rent* \$5.70/wk (E5376) **\$509**



F1DA108Tz

Pro 2 8-Port KVM Switch - P/S 2 & USB

Rent* \$8.23/wk (E5377) **\$735**



F1DA116Tz

Pro 2 16-Port KVM Switch - P/S 2 & USB

Rent* \$11.42/wk (E5378) **\$1,019**



F1DM208Tz

Matrix 2 x 8 Port KVM Switch - P/S 2 & USB

Rent* \$12.65/wk (E5379) **\$1,129**



F1DM216Tz

Matrix 2 x 16 Port KVM Switch - P/S 2 & USB

Rent* \$15.22/wk (E5380) **\$1,358**



Don't forget to include your Belkin All-In-One cables The easiest & neatest way to connect all your computers and servers to your PS/2 & USB KVM switches, providing image clarity for high-resolution applications.

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www.ht.com.au/cat/netgear

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Network Cards

FA 311
Ethernet Adapter
10/100 PCI
(A1372)

\$32

FA 312
10/100
Wake on Lan
Ethernet Adapter
(A1373)

\$42

FA 411
10/100
Mbps PC Card
(No dongle required)



(B9944)

\$125

FA511
10/100
CardBus PC Card
(No dongle required)
(D4112)

\$129



GA 302T
32 bit PCI
Gigabit network card
(D4118)

\$145

GA 622T
32/64 bit PCI
Gigabit network card
(B9943)

\$298

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Modular Solutions

Connect with copper or fibre gigabit. Link up to high-speed servers, connect switches, and combine fibre and copper networks. Two module bays on NETGEAR's FS700 series Modular Fast Ethernet Switches give you extraordinary upgrade flexibility. These non-blocking 19" units provide 24 or 48 10/100 Mbps, auto-sensing ports with Auto Uplink™ support.

FS726 24 Port 10/100, 2 Module slots



Rent* \$13.17/wk

(D0873)

\$1,175



AG711T
Copper module

Rent* \$7.49/wk (D0921) **\$669**

FS750 48 Port 10/100, 2 Module slots



Rent* \$23.81/wk

(D0874)

\$2,399



AG711F
Fibre module

Rent* \$10.53/wk (D0924) **\$940**

New Business Solutions

Managed Solutions

NETGEAR's Layer 2 non-blocking managed switches boost small business networks with 24 10/100 ports, 2 stacking ports, and 2 gigabit ports - use built-in Copper Gigabit or GBIC slots. Management includes SNMP, RMON, VLAN, QoS, port trunking, Spanning Tree, and port mirroring. All ports are auto-negotiating and support Auto Uplink™ technology.



FSM 726S - Managed 24 port 10/100 switch with 2 stacking ports and 2x Gigabit ports

Rent* \$23.48/wk (D8885)

\$2,095

Gigabit Solutions

These high performance Gigabit switches provides either fibre or copper backbone connectivity for power workgroups, data centres and server farms. No additional modules are required - each product is ready to install straight from the box.

GS 508T
8 port 10/100/1000
Gigabit switch

Rent* \$23.07/wk (B9916)

\$2,325

GS524T 24 port
10/100/1000 Mbps Gigabit
Switch

Rent* \$46.09/wk

(D5961) **\$4,995**

FS 518T 2 port 100/1000
with 16 ports 10/100

Rent* \$18.43/wk (A1374)

\$1,645

GS516T 16 port
10/100/1000 Mbps Gigabit
Switch.

Rent* \$36.61/wk (D5960)

\$3,689

FS 309T 8 10/100 ports
1Gig Uplink

Rent* \$6.93/wk (D8887)

\$619

FS 517TS 1 port
100/1000 and 16 port 10/100
stackable switch (copper)

Rent* \$16.75/wk (C2299)

\$1,495



GS524T

Switches

FS 105



FS 105 5 port 10/100
auto-sensing switch (84722) **\$138**

FS 108 8 port 10/100
auto-sensing switch (70905) **\$214**

FS 524



FS 116 16 port 10/100
auto-sensing switch
(A5347) **\$435**

FS 516 16 port 10/100 auto-sensing
and internal PSU/Vista

Rent* \$7.38/wk (60522) **\$659**

FS 524 24 port 10/100 auto-sensing
switch

Rent* \$9.51/wk (77549) **\$849**

FS 524S 24 port 10/100 auto-sensing
switch - stackable

Rent* \$17.20/wk (B6540) **\$1,535**

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Wireless Networking & Routers



Wireless

The NETGEAR wireless family means that you never have to be tied down by your cabling again! Whether you are looking to add to your wired Ethernet network or set up a new network the NETGEAR wireless products allow you to share network resources. These plug and play devices enable homes and businesses, even those without network IT staff, to deploy and maintain wireless networks easily and reliably. The new 802.11a solution transfers data at 54 Mbps and 72 Mbps in turbo mode for more efficient downloads of high-bandwidth applications.

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
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802.11b Products - 11Mbps



MA 101
11Mbps Wireless USB Adapter
(C7110)
\$229



MA401
11Mbps PCMCIA Adapter
(C8117)
\$179



MA301
11Mbps PCI Adapter Cradle
(Requires MA401)
(B9927) **\$98**



MA701
11Mbps Type I Compact Flash Card
(E5891)
\$235



ME102
11Mbps Wireless Access Point
(B9929)
\$429



MR 314 11Mbps Cable/DSL router with integrated 4 port 10/100 switch & built in access point
Rent* \$6.44/wk (C5223)
\$575

802.11a Products - 54Mbps



HE 102
54 Mbps Wireless Access Point
Rent* \$11.71/wk (E5824)
\$969



HA501
54Mbps Cardbus PC Card
(E5826)
\$429

Printer Servers



FM114P
Cable/DSL ProSafe (Wireless Firewall/ Print Server
(F0904)
\$599^{RRP}

PS 101
1 port Mini Print Server (E5832)
\$179

PS 110
10/100 Mbps Print Server, 2 parallel ports (67226)
\$259

PS 111W
Wireless Ready Print Server (E5833)
\$207

PS 113
10/100 Mbps Print Server, 3 parallel ports (A3287)
\$345

Routers

NETGEAR have a comprehensive range of Cable/DSL routers. All products offer standard shared internet access with NAT Firewall security and easy installation via web based configuration and DHCP. The products are plug and play and ideal for connection to either Cable/DSL or satellite broadband services. www.netgear.com.au offers specific installation information on both Telstra and Optus services.

RT 311 Cable/DSL router with 1 10/100 port
(97719) **\$289**



RT 314 Cable/DSL router with integrated 4 port 10/100 switch
(A8862) **\$369**

RP114
Cable/DSL router with integrated 4 port 10/100 switch and ability to control web content
(C5592) **\$269**



FR114W
Cable/DSL ProSafe Wireless Ready Firewall
(F0913) **\$379^{RRP}**



RO318 Cable/DSL Security router with integrated 8 port 10/100 switch
Rent* \$5.62/wk (C4896) **\$502**

FVS318
Cable/DSL ProSafe VPN Firewall with 8-port 10/100 Mbps switch



(F0242) **\$475**

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For all your small to medium business and home network needs please call for more information and pricing. We have an extensive range of fantastic D-Link products on our database.

ADSL Modem /Router

DSL-200

(B7197) **\$229**

USB ADSL Modem. Plug and Play USB interface with the host PC through a USB port

DSL-300 Ethernet ADSL Modem Connect single PC on an Ethernet LAN to an ADSL (B7198) **\$339**

ADSL Inline Filter DSL-10MF - Indoor Low Pass Filter required for Telephones & Faxes when running ADSL service (E6973) **\$20**

DSL-10CF -Indoor Splitter allowing connection of ADSL Modem & Telephone (E6971) **\$36**

DSL-504 ADSL

Router with 4 port 10/100 Switch Connect single or multiple PC's on an Ethernet LAN to an ADSL



(C7593) **\$425**

DSL-500 ADSL Router Connect single or multiple PC's on an Ethernet LAN to an ADSL (D0801) **\$373**

IP Router for ADSL/Cable Modem

DI-704P

IP Router for DSL/Cable Modems with 4-Port Switch & Single Port Print Server

Built-in
Bigpond
Cable
Login



SPECIAL PRICING

(E5861) **\$229**

DI-713P 11Mbps Wireless IP Router has 10Mbps WAN Port for DSL / Cable Modem with 3-Port 10/100Mbps Switch & Single Parallel Port Print Server

Rent* \$6.49/wk (C7596) **\$579**

DI-707P IP Router for DSL/Cable Modems with 7-Port Switch & Single Port Print Server **SPECIAL PRICING** (E7329) **\$295**

DI-804 IP Router for DSL and Cable Modems with 4-port 10/100Mbps switch

(C2361) **\$249**

10/100 Switches

DES-1016D

16-Port 10/100Mbps Fast Ethernet Unmanaged Switch, 16-Port 100Base TX Auto-Negotiating (NWAY) 10/100Mbps Switch, Half-/Full-Duplex, IEEE 802.3x Flow Control, Auto-Polarity Correction, Expansion via MDI Uplink Port Desktop Size (F0915)

\$Call



DES-1005D 5 Port 10/100Mbps Fast Ethernet Switch with 5 x N-Way UTP Ports. Palm Size (85101) **\$128**

DES-1008D 8 Port 10/100Mbps Fast Ethernet Switch with 8 x N-Way UTP Ports. Palm Size (98254) **\$186**

DES-1024R+ 24-Port 10/100 Mbs Fast Ethernet Switch, Optional 2-Port 100 Base FX Fiber (DES-102F) (E3669) Rent* \$7.47/wk **\$667**

DES-3326 24-Port 10/100Mbps Fast Ethernet Layer 3 Managed Switch, 24-Port 100BaseTX Auto-Negotiating (NWAY) 10/100Mbps Switch, Supports RIP /I/I Routing Protocol, Quality of Service (QoS) for Integrated Voice. Rent* \$30.26/wk (D1197) **\$3,049**

Gigabit Solution

DGS-1008T

8-Port Copper Gigabit Ethernet Switch. Unmanaged Copper Gigabit Ethernet Switch 8 x 10/ 100/ 1000Mbps Auto-Negotiating Ports (D9338) Rent* \$22.12/wk **\$1,974**

Copper
Gigabit



New Product

DGE-500T 32-Bit PCI Bus Copper (RJ45) Gigabit Ethernet adapter (E2058) **\$119**

DES-1226R 24-Port 10/100Mbps Fast Ethernet Unmanaged Switch with Option Slot or 2-Port Gigabit Module (E7388) **\$1,357**

DES-1009G Gigabit ethernet Switch 8 Port 10/100Mbps Unmanaged Switch with 1 Port 1000Base T Gigabit (Copper) Rent* \$7.83/wk (D1196) **\$699**

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Home Networking

Wireless Solutions

DWL-1500

D-Link Air 11 Mbps Wireless LAN Indoor Bridge with POE Ethernet to Wireless LAN multipoint Bridge or Access Point. Built in Power over Ethernet.

Rent* \$7.38/wk (D9147) **\$659**



DWL-900AP D-Link AIR 11 Mbps Wireless LAN Access Point

(E5877) **\$319**

DWL-650 11 Mbps Wireless LAN PCMCIA Card

(A9247) **\$159**

DWL-520 11 Mbps Wireless LAN PCI Adapter

(D9148) **\$199**

DWL-500 D-Link AIR 11 Mbps Wireless LAN PCI Adapter

(A9241) **\$239**

D-Link's **NEW** Product Range

DCS-1000

Standalone Internet Network Camera with CPU & RAM - 10/100Mbps Fast Ethernet Port - Connection for External Devices

Rent* \$9.85/wk (E3900) **\$879**



DI-840V

IP Router / Broadband Internet Gateway with 8 IPSec tunnels Support and 4 built-in Fast Ethernet Switch LAN ports.

Rent* \$Call/wk (F0895) **\$Call**



VPN Router

NEW

DMP-HD610

D-Link Roq-It External USB Hard Drive MP3 player with 150 hours of music playback - 10GB Storage Capacity - Built-in Rechargeable Battery - Remote Control Included - Large Graphic LCD with Blue Backlight

Rent* \$8.17/wk (E3904) **\$729**



DES-3226

24-Port 10/100Mbps Fast Ethernet Managed Switch with Optional Gigabit Module - 24-Port 100BaseTX Auto-Negotiating (NWAY) 10/100Mbps Switch - Option Slot for 1-Port Gigabit Module

Rent* \$24.64/wk (E7336) **\$2,199**



DFL-500

Firewall in a desktop box with complete virus scanning, intruder protection and remote VPN access functions for SOHO Networks

(F0900) **\$Call**

Secure Firewall & VPN



NEW

DFM-560e+

External 56K Voice and Data Modem - K56flex/ITU V.90

(E7338) **\$112**



NEW

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**HARRIS
TECHNOLOGY™**

LCD KVM Switch

The LKS-801 and LKS-1601 combine an 8 or 16 port KVM switch, keyboard, 15" LCD screen, and mouse pad in a 1U high rack drawer. Just slide the console out, flip the LCD cover and you are ready to go to work. Save up to one-third of your rack cabinet space!



NEW

LKS-801

8 port KVM with LCD, KB & mouse in 1U drawer

Rent* \$45.84/wk (E7463) **\$4,845**

LKS-1601

16 port KVM with LCD, KB & mouse in 1U drawer

Rent* \$51.91/wk (E7464) **\$5,625**

ServerLink SOHO KVM Switches

Built upon the proven and reliable ServerLink Infinity technology, the new range of ServerLink SOHO KVM switches offer a low cost solution for controlling 2 or 4 computers from a single monitor, keyboard & mouse. All ServerLink KVM switches feature keyboard & mouse emulation to guarantee error free switching and flawless booting.

**INCLUDES
ALL
CABLES!**



SL-251-P

2 port ServerLink inc. 2 x 2m PS2/VGA cables

(E3692) **\$199**

SL-451-P

4 port ServerLink inc. 4 x 2m PS2/VGA cables

(E3694) **\$299**

Serverlink Infinity KVM Switches

The ServerLink Infinity range of KVM switches allow you to control up to 256 PCs or network servers from a single monitor, keyboard & mouse. All ServerLink Infinity KVM switches feature user friendly On-Screen-Display for hassle free switching.



ServerLink Infinity Range

**SERVERLINK
INFINITY**

SL-221

2 port ServerLink KVM for PS2

(B3047) **\$270**

SL-221-P

2 port ServerLink inc. 2 x 2m PS2 cables

(B3048) **\$317**

SL-421

4 port ServerLink KVM for PS2

(A9890) **\$349**

SL-421-P

4 port ServerLink inc. 4 x 2m PS2 cables

(B2759) **\$440**

SL-821

8 port ServerLink KVM for PS2

Rent* \$10.97/wk (97888) **\$979**

SL-821-P

8 port ServerLink inc. 8 x 2m PS2 cables

Rent* \$12.99/wk (97889) **\$1,159**

SL-1621

16 port ServerLink KVM for PS2

Rent* \$17.92/wk (97890) **\$1,599**

SL-1621-P

16 port ServerLink inc. 16 x 2m PS2 cables

Rent* \$22.63/wk (97891) **\$2,019**

SL-CKP-02

2m 3-in-1 Comp. to ServerLink cable for PS2/VGA

(63972) **\$27**

SL-CKP-03

3m 3-in-1 Comp. to ServerLink cable for PS2/VGA

(D0973) **\$38**

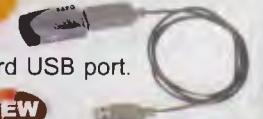
SL-CKP-05

5m 3-in-1 Comp. to ServerLink cable for PS2/VGA

(63976) **\$59**

Comsol USB to Infrared Adapter

This adapter is for enabling IrDA wireless data communication through a standard USB port. Ideal for wireless data transfer between desktop PC and notebook or PDA.



NEW

UIR-100

USB to IrDA wireless adapter

(D8944) **\$129**

Comsol USB Converters

UPC-100

USB to IEEE1284 printer converter

(82692) **\$55**

UMC-100

USB to RS232 9 pin serial converter

(80782) **\$70**

UEC-100

USB to 10/100 Ethernet converter

(82594) **\$145**

UKMC-100

USB to PS/2 KB & Mouse converter

(B0557) **\$70**

USC-100

USB to SCSI 2 (HPD50M) converter

(D0937) **\$180**

UPCI-100

2 port USB PCI controller card

(B4493) **\$44**

UPCI2-100

5 port USB 2.0 PCI controller card - 480 Mbps

(D8945) **\$124**



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Product**



Ramp Up To 54Mbps Wireless Speeds

802.11a Access Point & Cardbus Bundle

Rent* \$12.31/wk (F0860)

\$1,099

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Return to Base
- ☐ Upgrade
Return to Base
of Warranty
Extension to
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Key Features

- Replace or complement wired networks with new high-speed wireless LAN products designed for organisations of all sizes
- Choose from Intel's broad Wi-Fi* product line, optimized for notebook, desktop and handheld PCs
- Maximise your WLAN investment with products that have advanced features allowing you to easily scale network performance and coverage

Intel® PRO/Wireless 5000 LAN products create a high-performance, low-cost wireless 5 GHz network that's easy to install and manage. An IEEE 802.11a-standard Wireless LAN gives you data speeds up to five times faster than comparable systems, with sufficient network capacity to handle more users, more data, and high-bandwidth applications.

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available on all items.



802.11a PCI Card

(F0856) **\$475**



802.11a Access Point

Rent* \$10.03/wk (F0857) **\$895**



802.11a Cardbus Adapter

(F0858) **\$365**

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Sales: 1300 13 9999
Fax: 1300 13 6666

Web: www.ht.com.au
Email: sales@ht.com.au



Delivery
Australia-Wide

JUL
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The Best Case Scenario from Targus

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
HARRIS TECHNOLOGY.

*Delivery charges extra

TARGUS
Essential Accessories for Mobile Computing

CD Cases

24CD Steel Case



(F0759) **\$18**

104CD Sports Case



(F0760) **\$39**

64CD Odyssey Case



(F0761) **\$24**

32CD Odyssey Case



(F0762) **\$17**

32CD Delta Case



(F0763) **\$17**

Sportline Standard Backpack



Platinum/Black

(F0752) **\$94**

The Sportline Backpack appeals to today's mobile professionals with an active lifestyle. Constructed of heavy-duty fabrics with nylon webbing reinforcement this backpack contains a padded computer compartment to protect your notebook, multiple compartments for your files and accessories and padded shoulder straps for superior comfort. Other features include a mobile phone pouch, moulded carrying handle and a cushioned mesh back.

Blue/Black

(D6300) **\$94**

Sportline Deluxe Backpack



TSB315

(F0754) **\$120**

The TSB315 is constructed of heavy-duty fabrics with nylon webbing reinforcement, a padded computer compartment to protect your notebook, multiple compartments for your files and accessories, and padded shoulder straps for superior comfort. Slightly larger than the Standard Sportline Backpack, this pack features a weather-proof flap and more pockets, as well as a mobile phone pouch & CD or MP3 player pockets. Available in cool blue/black colour scheme.

RAKGear Notebook Backpack



(F0755) **\$83**

Stylish & comfortable notebook backpack designed for the active user. The RAKGear's patented "even weight distribution rack system" distributes weight more evenly and therefore alleviates the stress put on the spine, back and shoulders. The inclusion of lightweight, durable "shelves" that can accommodate various loads, prevents contents from settling at the bottom of the backpack & concentrating stress on one part of the back. The wide, padded & contoured straps, increase comfort & help improve carrying posture.



Sports Backpacks

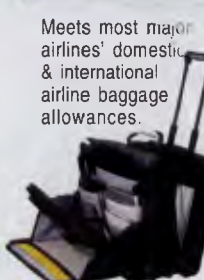


Olive
(other colours available)

(C9860) **\$147**

The Sports Backpack combines ergonomic design with functionality for the mobile road warrior. Safely protecting your notebook with a padded compartment and an additional removable air cushion for extra protection, the Sports Backpack also provides multiple compartments for your files and accessories including CD & MP3 players, disks, cables and PC cards. Stylish & lightweight, it's many features include a mobile phone pouch, ergonomic padded shoulder straps and a file section.

Easy Roller



(B1659) **\$257**

The perfect business case-on-wheels to carry any size notebook. The EasyRoller has a hide-away 91.5cm retractable handle, in line skate wheels which not only glide effortlessly, but are inconspicuous - so when the handle is concealed, it's a stylish travel case. Featuring the 'ergon' carry handle and a floating wall in the computer compartment, it also has the patented SafePORT adjustable air cushion to guard against damaging drops and bumps. There are front and rear compartments for files, accessories and overnight items.

Trademark Rolling Case



(E3497) **\$176**

The Trademark Universal Rolling Case is ideal for the business traveller or student. With it's five stage telescopic handle, 'in-line' skate wheels for easy manoeuvring, and ample storage space, this case is the easiest way to transport your entire mobile computing essentials. Made from koskin & nylon, this case features removable storage pouches, a security strap, zip-down work station, expanding file section and a luggage strap. Meets carry-on restrictions for most major airlines.

Messenger Cases



(E3509) **\$67**

The latest in messenger style cases with the stylish Trademark & the funky BlackTop cases. While the Trademark features a contemporary mix of koskin & nylon, the BlackTop features signature rubber Compu-Tread™ around the outside for an edgy, urban sophisticated look & shock absorption. Both cases provide protection for your notebook with a well-padded sleeve, storage space for all your files and accessories with a full width rear pocket and padded, adjustable shoulder straps. The BlackTop Messenger also has a zip-down work station. These Messenger Cases are the ultimate combination of fashion and practicality in today's high tech world.

BlackTop Cases

A funky NEW blue/black range designed with edgy, urban sophistication and featuring the signature rubber Compu-Tread™ for design and shock absorption.



(C9570) **\$57**



Standard
(E6996) **\$83**

BlackTop Standard Notebook and BlackTop Deluxe Notebook available.

Deluxe
(E7009) **\$89**

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PRICING AND SPECIFICATIONS MAY CHANGE. PLEASE REFER TO PAGE 2 FOR DETAILS.



FINANCE METHODS ARE SUBJECT TO APPROVAL.

Hot New Accessories from Targus

PDA Combo Kits

Kit includes, case, removable swivel belt clip, pack of 4 PVC screen protectors & a spare stylus.



The case can be worn on your belt or slipped into your pocket, has a concealed pocket for your spare stylus, is snug fitting with a slim appearance & made from light weight Neoprene.

- CHKIT1 - iPAQ (F0735) **\$27**
- CHKIT2 - Jornada/Tosh (F0736) **\$27**
- CHKIT3 - Palm M500/505 (F0737) **\$27**

Ultra Mini 4-Port USB Hub

This ultra light-weight, compact 4 port USB hub is suitable for PC notebooks or USB-enabled desktop computers.



Over current protection on each port prevents power shutdown of the hub. Supports both full-speed and low-speed transfer rates and has a 1m cable.

PA055U (F0749) **\$42**

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
HARRIS TECHNOLOGY
*Delivery charges apply.

PDA In - Vehicle Charger

PDA In-Vehicle Chargers Charge your PDA while on the road. Ideal for the mobile user, this charger plugs into your cigarette lighter to keep you fully powered.



- CHCV01 - iPAQ 38xx (F0738) **\$19**
- CHCV02 - HP Jornada (F0739) **\$19**
- CHCV03 - Palm M500/505 (F0743) **\$19**
- CHCV04 - iPAQ 36xx/Tosh e570 (F0745) **\$19**

Storage Drive on a key ring

A lightweight & compact, mobile storage device with a self contained USB interface, Targus "Go-Anywhere" StorageDrives are miniature in size. Able to withstand vibration and movement associated with mobility, the devices can operate under extremes of humidity and temperature, and magnetic fields. Driverless under Windows 2000 and later, they are available in 16MB, 64MB and 128MB capacities.



- PA516C - 16MB (F0730) **\$125**
- PA564U - 64MB (F0731) **\$209**
- PA128U - 128MB (F0733) **\$335**

Keypad with integrated calculator

Keypad with integrated calculator. The Targus Mobile Mini Keypad with calculator is a 17 keypad with 12 additional calculator functions. Lightweight and compact, it is fully compatible with Windows 98, 2000, Me, XP and greater. Neatly stores a 91.5cm USB cable.



PAUK001 V.3 (C1921) **\$119**

Universal Auto/Air Adapter

A dual purpose power source, the new-look, ultra-slim Universal Auto/Air allows you to plug virtually any notebook into airline seats with Empower™ capability and works in vehicles with standard cigarette lighters. Power or re-charge your notebook on the road or in the air!



- PA360U - most IBM, Toshiba & Compaq notebooks (F0747) **\$216**
- PA380U - most Dell, HP, Sony, Fujitsu & Panasonic notebooks (F0748) **\$216**

6 Metre Retractable Phone Cable

A convenient, inexpensive alternative to bulky telephone cables. Simply pull one end and the telephone cord extends up to 6m. Reels back in to its container for easy storage at the push of a button. Includes two RJ connectors.



PA205U (F0746) **\$26**

Multimedia Card Reader/Writer

USB Memory Card Reader - CF/SD/SM A miniaturised USB digital media reader, the Targus Compact Flash/Secure Digital/Smart Media USB Memory Card Reader is ideal for image transfer from digital cameras to PCs. 30 times faster than a serial interface, no PC card adaptors are needed.



(E6995) **\$93**

Security Products

Defcon™ Authenticator

Ultimate data protection

(E5313) **\$259**

Defcon™ 3

Remote security system with 94 decibel alarm.

(C3814) **\$99**

Defcon™ 1

Anti-theft system that guards your notebook with motion detection

(66929) **\$89**

Defcon™ CL

Cable Lock with cut-resistant, galvanised steel cable

(81511) **\$67**

Camera Cases

Pro Black Camera Case

(D6169) **\$29**

Pro Black Video Case

(D6172) **\$59**

Digital Memory & Readers

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
HARRIS TECHNOLOGY
*Delivery charges extra



Pocket PC Accessories

CompactFlash Modem


 (83607) **\$259**

CompactFlash LAN Card


 (F0767) **\$239**

CompactFlash GPS Card



Rent* \$7.39/wk

 (E5015) **\$649**

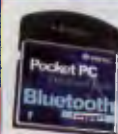
Compact Camera


NEW

(F0865)

\$250

Compact Bluetooth


NEW

(F0866)

\$260


CompactFlash



With CompactFlash Digital Film you can increase the storage capacity of any compatible digital camera or PDA.

 16MB CompactFlash (B2920) **\$43**

 32MB CompactFlash (B2921) **\$59**

 64MB CompactFlash (B2922) **\$89**

 96MB CompactFlash (D9286) **\$119**

 128MB CompactFlash (B2923) **\$155**

 256MB CompactFlash (C0777) **\$313**

Rent* \$9.11/wk

 512MB CompactFlash (E1225) **\$813**
NEW


MultiMedia Cards



MultiMediaCard is the world's smallest removable flash storage card! Suitable for MP3 players, Mobile phones and Digital Video Cameras.

 16MB MultiMediaCard (B9871) **\$59**

 32MB MultiMediaCard (B9873) **\$88**

 64MB MultiMediaCard (B9878) **\$153**


SmartMedia



SmartMedia cards expand the storage capacity of any compatible digital camera. Suitable for digital cameras from Olympus, Fuji and others.

 16MB SmartMedia (B2915) **\$29**

 32MB SmartMedia (B2916) **\$49**

 64MB SmartMedia (B2917) **\$93**

 128MB SmartMedia (C3680) **\$187**


SecureDigital Cards



SecureDigital media features faster data transfer rates and the ability to manually write-protect data.

 16MB SecureDigital (D4115) **\$68**

 32MB SecureDigital (D4116) **\$108**

 64MB SecureDigital (D4117) **\$175**

 128MB SecureDigital **NEW** (D5918) **\$352**
NEW

USB Digital Memory Readers

Single slot readers for digital memory cards for only **\$38**

All models feature:

- Single-Slot
- High-Speed
- Hot-Swapping

 (F0861) **UIC4** USB CompactFlash reader

 (F0862) **UIS4** USB SmartMedia reader

 (F0863) **UID4** USB Secure Digital/MultiMedia Card reader

 (F0864) **UIM4** USB Memory Stick reader

Image for illustration purposes only.



FireWire Digital Memory Readers


POCFFW

 FireWire CompactFlash Card Drive (D4161) **\$105**
POSMFW

 FireWire SmartMedia Card Drive (D4162) **\$127**
MIMKFW

 FireWire Memory Stick Card Drive (D4163) **\$138**

JUL

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Copying and Connectivity

Verbatim

CopySmart CD Copiers

Copy discs with a single button press.
Standalone - no PC required.

Available with 1, 3 or 7 recording drives

NEW

CopySmart 40x (B9843) \$1,229

Rent* \$13.77/wk

NEW

CopySmart Plus 1-3 40x (E3503) \$1,940

Rent* \$21.75/wk

NEW

CopySmart Plus 1-7 40x (E3504) \$3,882

Rent* \$36.72/wk

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
HARRIS TECHNOLOGY.

*Delivery charges extra.
Verbatim
NoteBook Accessories
Cardbus FireWire Card


Add 2 FireWire ports to your notebook.

 (B9849) **\$109**
Cardbus USB 2.0 Card
NEW


Add 2 USB 2.0 ports to your notebook

 (E6328) **\$106**
Portable CD-ROM drive
NEW


Slimline 24x CD-ROM drive for notebooks.

 (97766) **\$299**
KOUWELL IK
PCI Firewire Cards


Connect your digital video camera to your PC. Download and edit your own movies.


NEW product

PCI Firewire/USB 2.0 Combo Card (E5013) \$183

PCI Firewire Card - 4 ports (90689) \$88

PCI Firewire Card - 6 ports (A5161) \$119

6 pin to 6 pin Firewire cable (B2905) \$13

KOUWELL IK
USB Hubs & Cards


USB 2.0 4 Port Card (NEW) (84801) \$29

USB Hub - 6 ports (79702) \$65

USB Network Cable (B2908) \$60

Internal 3.5" USB Hub - 4 ports (B2909) \$49

KOUWELL IK
PCI SCSI Cards

NEW 160MB Card

The easy way to expand your PC. Connect multiple SCSI devices to one card.

PCI Bus, Ultra-SCSI (90681) \$69

PCI Bus, Ultra-Wide (90683) \$154

PCI Bus, 2 channel Ultra-Wide (90684) \$340

PCI Bus, Ultra2-Wide (90685) \$245

PCI Bus, Ultra 160 (B9847) \$438

KOUWELL IK
IDE Acceleration & ExpansionCard


Get maximum speed from your hard drive!

Supports transfer speeds of up to 133MB/s with new ATA133 drives.
Run up to 4 extra drives on your system.

Offers RAID data protection.

NEW

PCI IDE Ultra DMA 133 RAID Card (E7377) \$110


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Verbatim

RENTSMART

*The figures quoted are based on a per week basis over 3 years. T.A.P. Terms & Conditions apply.

Prices are subject to change. Check here for latest prices & products!!

Web Direct

www.ht.com.au/cat/verbatim

CD / DVD Production Equipment

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.

HARRIS TECHNOLOGY

*Delivery charges extra

PRIMERA TECHNOLOGY, INC.

Signature IV CD Printer



- 1200x1200 dpi res
- Fast: 27 seconds per disc.

Rent* \$29.72/wk (B9917)

\$2,995

Signature Pro CD Printer



- 2400dpi
- Superfast
- Dual Ink Cartridges

Rent* \$37.60/wk (C3681)

\$3,789

Inscripta Printer



Special Price

- 610 x 305 dpi Thermal
- Durable finish

Rent* \$46.25/wk (B2932)

\$4,889

See page 35 for Printable Discs for these printers

Composer Family



PRIMERA TECHNOLOGY, INC.

- Premastering software Included
- optional inkjet printer shown

1 x CD-R

Composer CD-R 24x, 50 disc

Rent* \$46.57/wk

(D5895)

\$5,047

1 x DVD-R

Composer DVD-R 2x/ CD-R 8x, 50 disc

Rent* \$68.53/wk

(C5561)

\$7,699

2 x CD-R

ComposerPro CD-R 24x, 100 disc

Rent* \$72.76/wk

(D5896)

\$8,175

2 x DVD-R

ComposerPro DVD-R 2x/ CD-R 8x, 100 disc

Rent* \$98.61/wk

(D4190)

\$12,165

4 x CD-R **NEW**

ComposerMAX CD-R 24x, 400 disc

Rent* \$139.95/wk

(E5594)

\$17,395

4 x DVD-R **NEW**

ComposerMAX DVD-R 2x / CD-R 8x, 400 disc

Rent* \$211.36/wk

(E5596)

\$26,270

Add a printer!

Add a printer from those shown at left and an adapter plate to upgrade your Composer / Composer Pro to a full burn and print solution.



Printer Stand for Inscripta Printer

(B8878) **\$99**

Printer Stand for Signature III/IV/Pro Printer

(C1748) **\$99**

Desktop Series



RIMAGE™

NOW 24x

Network Burning

Includes Printer



- Premastering and Network software Included

1 x CD-R

Desktop 800 CD-R 24x, 60 Disc

Rent* \$79.43/wk

(D4141)

\$9,473

1 x DVD-R

Desktop 800 DVD-R 2x/ CD-R 8x, 60 Disc

Rent* \$92.43/wk

(D4148)

\$11,403

2 x CD-R

Desktop 1000 24x, 50 disc

Rent* \$132.18/wk

(D4143)

\$16,306

Desktop 4000 24x, 50 disc (optional 110 disc)

Rent* \$161.14/wk

(D4144)

\$20,029

2 x DVD-R

Desktop 1000 DVD-R 2x/ CD-R 8x, 50 disc

Rent* \$154.92/wk

(D4151)

\$19,256

Desktop 4000 DVD-R 2x/ CD-R 8x, 50 disc (optional 110 disc)

Rent* \$183.48/wk

(D4152)

\$22,806

4 x CD-R

Desktop 4000 24x, 50 disc

Rent* \$170.75/wk

(D4145)

\$21,224

4 x DVD-R

Desktop 4000 DVD-R 2x/ CD-R 8x, 50 disc

Rent* \$214.48/wk

(D4154)

\$26,659

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PRICING AND SPECIFICATIONS MAY CHANGE. PLEASE REFER TO PAGE 2 FOR DETAILS.



FINANCE METHODS ARE SUBJECT TO APPROVAL

CD and DVD Media: Storage for Life

DataLifePlus CD-R - 24x



super
AZO

80 Min.
700MB
1x - 24x
10 Pack
(D4114) **\$13**

80 Min.
1x - 24x Singles
(D5933) **\$2**

DataLifePlus CD-R Audio



80 Min.
10 pack
(C7889) **\$18**

80 Min.
Singles
(D0011) **\$2**

Not all items are
in stock at all
stores but can be
ordered for Pick-
up or Delivery.
**HARRIS
TECHNOLOGY.**
*Delivery charges extra.

Pocket Colours 8cm CD-R



Mini CD's that fit in your pocket!

- Store up to 3 hours of MP3's or up to 185MB of pictures, files or any data you like.
- Compatible with any standard tray based CD player or burner

21min 185MB 1x - 16x,
5 Pack
(D9192) **\$9**

21min 185MB 1x - 16x,
10 Pack
(C9459) **\$17**

Printable CD-R Media



In Spindles of 50
Inkjet Printable
80 min 24x

(E4363) **\$53**

Silver Thermal Printable
80 min 16x

(D0562) **\$53**

See page 34 for CD Printers.

DataLifePlus Colours CD-R



80 Min. 700MB 1x - 24x
coloured CD-R's
in a 25 pack
(B1355) **\$30**

80 Min. 700MB 1x - 24x
coloured CD-R's
in a 10 pack
(D9227) **\$13**

DataLife CD-R

- Third generation Phthalocyanine Recording Dye Technology
- Scratch Resistant Surface

80 Minute DataLife
SlimCase 10
pack 16x (C7091) **\$12**

80 Minute DataLife Spindle
25 pack 16x (C7093) **\$25**

DataLifePlus CD-RW

700MB CD Rewritable 2x-4x
5 Pack Colours

(D9230) **\$9**



2x - 4x Singles
650MB
(77492) **\$2**

4x - 10x Singles
650MB
(B2658) **\$3**

Verbatim DVD Media

DVD-R



4.7 GB DVD-R for General
Data - Singles
(C8840) **\$12**

Printable surface
discs also available

DVD-RW



4.7 GB DVD-RW
(version 1.1) - Singles
(C8841) **\$15**

DVD+R



4.7GB DVD+R - Singles
(E7340) **\$12**

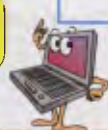
DVD+RW



4.7GB DVD+RW - Singles
(D9166) **\$15**

Verbatim DataLifePlus CD's represent the latest in technology. Featuring a proprietary blue Metal-Azo dye which has the best resistance to sunlight, silver reflective layer for optimum read and write performance and multispeed recording.

Did you
know...



Pioneer

Prices are subject to change. Check here for latest prices & products!!

Web
Direct

www.ht.com.au/cat/pioneer

Multimedia: DVD & Blank Media

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.

HARRIS TECHNOLOGY.

*Delivery charges extra.

Pioneer DVD-R MEDIA



- Jewel Case
- Storage-capacity of 4.7GB
- Suitable for DVD Video & Data backup
- Playable on both DVD-Video players & DVD-ROM drives
- Commercial and Home DVD-Video production
- Large sized data archive storage (not for use with Pioneer DVR-S201)

DVS-R47A (DVD-R)

(E3852) **\$14**

DVS-RP470SDF

- White printable version

(C2322) **\$18**

Pioneer DVD-RW MEDIA



Rewritable DVD media: Jewel case: storage capacity of 4.7GB: Suitable for DVD video & data: (not for use with Pioneer DVR-S201 authoring drive)

DVS-RW47B (DVD-RW)

(D9300) **\$24**

Pioneer



DVR-A04 DVD-R/RW Writer

FEATURES:

- Writes: DVD-R (2x)
- DVD-RW (1x)
- CD-R (8x)
- CD-RW (4x)



Rent* \$11.19/wk

\$999

INCLUDES:

(E3676)

- Veritas RecordNow & DLA for data
- ArcSoft ShowBiz for video editing including MPEG2 encoding function
- PowerDVD XP 4.0 for DVD movie playback
- Sonic MyDVD for authoring
- 5 x Blockbuster Video DVD movie rental vouchers
- 1 x DVD-R media
- 1 x DVD-RW media
- Permanent pen



DVR-A04FW

Rent* \$14.56/wk (E3679) **\$1,299**

plus firewire card, cable and DVDit! PE authoring software including MPEG2 encoder.

DVR-A04PRO

Rent* \$20.16/wk (E3681) **\$1,799**

plus ReelDVD professional authoring software (not including firewire card & cable)

DVD-A06SZ 16x

SLOT LOADING DVD-ROM DRIVE RETAIL KIT



(E5965)

\$175

FEATURES:

- 16x for DVD
- Ultra DMA66
- Vertical or horizontal mounting
- 40x for CD-ROM
- Super quiet mechanism

INCLUDES:

- Power DVD XP 4.0 software decoder
- Mounting screws & audio cable
- Pioneer DVD-ROM Drive (2 year warranty)



Includes: 5 x DVD movie rental vouchers from Blockbuster Video (included inside product box - see voucher for conditions and expiry dates)

DVS-R47AS5

DVD-R 5 PACK

(E7289)

\$93



FEATURES:

- Slim Jewel Case (5 pack)
- Storage-capacity of 4.7GB
- Suitable for DVD Video & Data backup
- Playable on both DVD-Video players & DVD-ROM drives
- Commercial and Home DVD-Video production
- Large sized data archive storage (not for use with Pioneer DVR-S201 authoring drive)

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HARRIS TECHNOLOGY™

PRICING AND SPECIFICATIONS MAY CHANGE. PLEASE REFER TO PAGE 2 FOR DETAILS.



FINANCE METHODS ARE SUBJECT TO APPROVAL.

Smart Storage Solutions

Zip 100 USB Powered

An affordable total storage solution as easy to use, but far superior to, the floppy drive
iomega's Zip® 100MB USB-Powered drive is affordable, reliable, easy to use and has a sleek, durable design powered through the USB cable for complete plug-and-play compatibility.


 (D0587) **\$182**

Portable Hard Disk Drive

iomega HDD portable drive is a complete solution that makes security, recovery and data storage easy. QuikSync™ automatic back-up and disaster recovery software protects your files. Features are built in a durable, slim design that's easy to take with you. Available in 20GB capacity.



USB2 Card sold separately

 (E7321) **\$436**


Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
HARRIS TECHNOLOGY.
*Delivery charges extra

Zip 100MB disk

(23772)

\$25
10-pack:

(21889)

\$189
Zip drive carry case

(31823)

\$49
Zip disk 250MB

(74454)

\$29
Zip disk 250MB 10 Pack

(74452)

\$249
Jaz 1 GB disk

3 Pack

(32844)

\$569
Jaz 2 GB disk

3 Pack

(57271)

\$615

NAS Servers

Choose iomega for easy-to-install and manage network storage solutions that allow multi-platform file sharing and data consolidation. Hot-swappable drives and RAID 5 data protection, iomega NAS servers deliver enterprise-class data access and reliability for small business budgets. Plus, you choose the capacity, OS, level of performance and data reliability – so you get the optimum data storage and backup solution.



160GB Rent* \$60.43/wk (C5567)

\$6,789

320GB Rent* \$73.86/wk (C5568)

\$8,809

Predator

iomega Predator 24x10x40 CD-RW drive

The all new and exciting iomega CDRW drive. An external 24x10x40 CDRW with USB 2.0 capability offers you blazing speed performance in terms of write speeds including a BURNPROOF feature to eliminate wasted CDs. The drive has one of the most unique designs with its sleek, slim and stylish architecture. Now included, the iomega Hotburn Software for effortless 2 step CD creation.


 (D9194) **\$454**

Host Powered 250 USB

NEW – Host-powered Zip® 250MB USB drive. Now it's even easier to take your information with you.

The Zip® 250 USB drive is now available with a USB cable that provides both data and power, so you don't need any external power source. Its easy to connect (just plug it in) and easy to launch (no rebooting)! This new drive is compatible with most major operating systems and all Zip® 100MB and 250MB Zip® disks.


 (B6404) **\$322**

Ask About...



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PRICING AND SPECIFICATIONS MAY CHANGE. PLEASE REFER TO PAGE 2 FOR DETAILS.

Sales: 1300 13 9999
Fax: 1300 13 6666
Web: www.ht.com.au
Email: sales@ht.com.au

Fly Buys.

Would you like
FlyBuys with that?

Kodak

RENTSMART

*The figures quoted are based on a per week basis over 3 years. T.A.P. Terms & Conditions apply.

Prices are subject to change. Check here for latest prices & products!!

Web Direct

www.ht.com.au/cat/kodak

Share Moments. Share Life™

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.

HARRIS TECHNOLOGY.

*Delivery charges extra

Kodak LS420

Simple. Little. Fun.

Introducing a nifty little camera that fits anywhere, goes anyplace, and does just about anything.

- 2.1 MP for beautiful prints
- Kodak color science technology
- Introduces new night shot flash mode
- On-camera print button Video with audio capabilities
- Part of the EasyShare System
- Movie mode audio recording during capture



Rent* \$8.87/wk (E7255)

\$792



Kodak DX4900

The first print-optimized

4.0 MP point & shoot digital camera designed to be one touch simple • New 3X Advanced Digital Zoom • 3 Sharpness models (sharp, standard, soft) • High Speed Sequence shooting up to 3FPS(Burst) • Flash modes (auto, fill, red-eye, off) • ISO settings (auto 100-400 or selectable 100,200,400) • White Balance modes (Auto, Daylight, Tungsten, Fluorescent) • Shutter Speed Controls Auto (1/2000 sec to 16 seconds).



Rent* \$13.21/wk (E3471)

\$1,179

Kodak DX3900

The high-performance camera.

Set your own color mode, ISO, and lighting exposure settings to get your perfect picture. Thanks to 3.1MP resolution, you'll get excellent picture quality on prints up to 11" x 14". The DX3900 comes with 6X zoom (2X optical and 3X digital) and a COMPACTFLASH Card to keep you shooting longer • CCD resolution • image resolution 3.1 megapixel 2160x1440 pixels • burst maximum 8 pictures at 0.8MP resolution • lens 35 mm - 70 mm, (35 mm equiv.) • auto focus • zoom 6x (2x optical, 3x digital).



Rent* \$11.14/wk (E7368)

\$994

Kodak DX3500

Simple-to-use

KODAK DX3500 Digital Camera. Get crisp, vibrant prints thanks to its 2.2MP resolution and 3X digital zoom. The DX3500 comes equipped with a COMPACTFLASH Card expansion slot so you can boost its memory capacity.

- KODAK Picture Software lets you instantly view, edit, e-mail, and print your pictures.
- Get great-looking prints with 2.2MP resolution and 3X digital zoom.



Rent* \$6.15/wk (C9587)

\$549

Kodak DX3215

Making digital easy- one picture at a time.

Great pictures made easy! Want to get into digital with ease? You've found your camera. Introducing the KODAK EasyShare DX3215. This camera gets you started with 1.3MP resolution for great prints up to 5" x 7". A 4X zoom (2X optical and 2X digital) lets you get closer to the fun. It's the perfect camera to get you into digital picture-taking. • 1.3MP resolution • One-touch picture transfer • 8MB internal memory.



(C9539)

\$439

Kodak DX3600

Easy share dock system

KODAK DX3600 Digital Camera with Kodak easy share dock system. Get crisp, vibrant prints up to 8" x 10" thanks to its 2.2MP resolution and 3X digital zoom. Start shooting right away with 8MB of internal memory. The DX3600 comes equipped with a COMPACTFLASH Card expansion slot so you can boost your camera's memory capacity. Recording time only limited by the size of the compact flash being used.



Rent* \$8.73/wk (C5964)

\$779

Kodak DX3700

Great pictures made easy.

EasyShare DX3700 Digital Camera. It has 3.1 MP resolution for excellent picture quality up to 11" x 14". Getting closer to the fun is easy with the 3x digital zoom.

- 3.1MP resolution
- 3x digital zoom!
- 8MB internal memory
- Compatible with the Kodak EasyShareCamera Dock



Rent* \$7.93/wk (D0792)

\$708



Collect 500 Bonus Fly Buys points when you purchase E7255, E3471, C9539, E7368, C5964, C9587 or D0792 between 20/06/02 - 31/07/02

Kodak



PICTURE CARDS

32MB Picture Card (62677)

\$65

64MB Picture Card (82249)

\$99

128MB Picture Card (A5253)

\$180

Kodak

QUALITY PAPERS



Ultra glossy 15 sheets (B1656)

\$14

Satin 15 sheets (D3251)

\$14

Semi gloss 75 sheets (D3258)

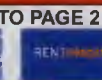
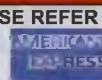
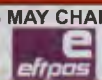
\$35

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Bluetooth



USB Mini Receiver

(E4364)

\$439

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NEW!



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(F0257)

\$259

QuickCam® Pro 3000

With its CCD sensor, QuickCam Pro 3000 takes pictures and videos with true 640x480 resolution. Use its built-in microphone to make live video calls over the Internet and send pictures and videos with your emails. QuickCam software lets you easily setup a digital surveillance camera and broadcast live video and audio over the web. Add professional titles, fades and wipes to your videos with the included MGI software. Connection via USB. 2-year warranty.

(B0805)

\$215

Logitech® Z340



The Logitech Z340 produces clear highs and distortion-free lows through a revolutionary 3-piece system design, delivering twice the bass energy of similar systems. The satellites provide a convenient headphone jack and volume control. An internal power supply eliminates bulky wall adaptors. 2-year warranty.

(E1070)

\$115

Cordless Freedom™

Enjoy complete control and reliable performance, without cords that catch or tangle. Access the Internet, open e-mail, search or launch applications with one touch of a key. Includes Logitech Cordless Mouse. 3-year warranty.



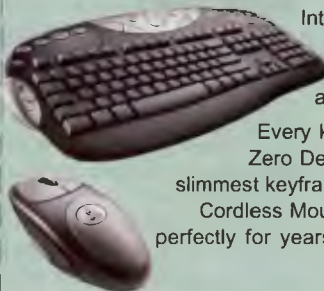
(D3991)

\$129

Cordless Freedom™ Optical

The ultimate cordless keyboard and optical mouse. Seamlessly access and navigate the Internet at the touch of a button or the scroll of the iNav wheel. Intuitive multimedia controls are at your fingertips and allow you to control MP3s, DVDs and CDs from your keyboard.

Every keystroke is made easy with Zero Degree Tilt, offering one of the slimmest keyframes available. The included Cordless MouseMan® Optical will perform perfectly for years to come. 5-year warranty.



(C6106)

\$215

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Cordless MouseMan Optical (C1186)

\$129



MouseMan Traveller (D4014)

\$109



MouseMan Dual Optical (D4013)

\$79



Optical Mouse (B9948)

\$45



Internet Navigator (D0560)

\$63



Deluxe Access 104 (B0819)

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High-breed Monitors

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SyncMaster 753DFX 17" CRT Monitor

SOHO Series Features:

- 16" Viewable Screen
- 0.20mm dot pitch (Horizontal)
- 1280 x 1024 max resolution @ 66Hz
- DynaFlat - Infinitely Flat Tube
- Smart III Surface Treatment (Anti-Static & Anti-Glare)
- On Screen Digital Display
- Plug & Play Compatibility
- MPR-II/NUTEK certified

(C1283) **\$425**



SyncMaster 955df 19" CRT Monitor

Graphix Pro Series Features:

- 18" Viewable Screen
- 0.20mm dot pitch (Horizontal)
- 1600 x 1200 max resolution @ 68Hz
- DynaFlat - Infinitely Flat Tube
- Smart III Surface Treatment (Anti-Static & Anti Glare)
- Onscreen Digital Display
- MPR-II/NUTEK Certified
- Plug & Play Capability

Rent* \$8.05/wk (C3975) **\$719**



SyncMaster 151s 15" LCD monitor

- 15" Viewable Screen
- 1024 x 768 max resolution @ 76Hz
- Colours 16.2M
- H.Frequency 30 ~ 61 kHz
- V.Frequency 50 ~ 75 Hz
- Contrast 330:1
- Optional Pivot to Portrait*
- Luminance 250cd/m2
- Viewing Angle 140°/120°
- Input connectors 15pin D-Sub
- Sync Type Composite H/V, SOG
- Power 30W(Max.)

Ivory Rent* \$10.41/wk (D3614) **\$929**

*the head of the monitor can be turned to provide either a portrait or landscape picture.



SyncMaster 151BM 15" Multimedia LCD monitor

- 15" Viewable LCD Monitor
- 1024 x 768 max resolution @ 76Hz
- 140°/120° viewing angle.
- Fast and accurate auto adjustment
- NUTEK Certified
- Optional Pivot to Portrait*
- Three colour choices: silver/ black/ ivory
- Pivot technology
- Built in Multimedia Speakers
- Optional USB-Hub available
- Weight 4.1kg

Rent* \$11.98/wk (D6237) **\$1,069**



SyncMaster 181T 18" LCD Monitor

The SyncMaster 181T is the ideal display for all business and professional applications. Its new slim design refined with Samsung's digital technology allows the product to fit all working environments. The SyncMaster 181T is power efficient as well. It consumes less than 1 Watt of power in power off mode, and its built-in power adaptor frees you from a dangling power brick, leaving your desk clean and simple. DVI-D/Analogue and DVI-D cable is included in box, brightness 500:1.

- Medically Certified • Ultra slim bezel.

Available in Black Silver and Ivory Rent* \$29.76/wk (E7318) **\$2,999**



SyncMaster 191T 19" LCD Monitor

The SyncMaster 191T is the ideal display for all business and professional applications. Its new slim design refined with Samsung's digital technology allows the product to fit all working environments. The SyncMaster 191T is power efficient as well. It consumes less than 1 Watt of power in power off mode, and its built-in power adaptor frees you from a dangling power brick, leaving your desk clean and simple. DVI-D/ Analogue and DVI-D cable is included in box, brightness 500:1.

- Medically Certified • Ultra slim bezel.

Available in Black Silver and Ivory Rent* \$33.73/wk (E7319) **\$3,399**

NEC

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Nothing Else Compares

NEC MultiSync LCD1700V

17" LCD Monitor

1280 x 1024

Rent* \$19.60/wk (E7297)

\$1,749^{RRP}

SUPER SLIM BEZEL!



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NATURAL FLAT CRT MONITOR RANGE



FE700+

17" CRT Monitor
1280 x 1024 @ 66Hz
Flat Aperture Grille

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\$525



FE750+

17" CRT Monitor
1600 x 1224 @ 74Hz
Flat Aperture Grille

Rent* \$6.71/wk (D1192)

\$599



FE950+

19" CRT Monitor
1792 x 1344 @ 68Hz
Flat Aperture Grille

Rent* \$11.42/wk (D1193)

\$1,019



FP1355

22" CRT Monitor
2048 x 1536 @ 75Hz
Flat Aperture Grille

Rent* \$19.60/wk (D1194)

\$1,749

NEC

V530

15" CRT Monitor
1280 x 1024
(B9125)

\$255

V730

17" CRT Monitor
1280 x 1024
(B7522)

\$329

V930

19" CRT Monitor
1600 x 1200
Rent* \$6.44/wk
(C9739)

\$575

NEC HAS A WIDE RANGE OF LCD & CRT MONITORS, DATA PROJECTORS AND PLASMA DISPLAYS



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SVGA; 800 x 600
1000 ANSI Lumens
Horizontal & Vertical Lens Shift
Weights only 2.5kg

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\$3,740



LCD1850E

18" LCD Monitor
1280 x 1024 Max.
Slim Bezel
Also available in white.

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\$2,539



42MP3 PlasmaSync*

42" Plasma Multimedia Display
Native Resolution 853 x 480
16:9 Aspect Ratio
160 Degree Viewing Angle

HDTV COMPATIBLE

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New
Silver
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Latest Keyboard & Mouse Range

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MS Internet Keyboard PS/2

The Internet Keyboard has 10 Hot Keys on a comfortable standard keyboard design that also includes a detachable palm rest. The Hot Keys allow you to browse the web, or check e-mail directly from your keyboard. The IntelliType Pro software also allows you to customize your hot keys.



(86485) **\$47**

MS WheelMouse Optical PS2/USB

IntelliEye optical technology. More precise and better control than an old-fashioned mouse with a ball. Wheel for easy scrolling. Roll the wheel forward or backward instead of clicking on a scroll bar or arrow. No moving parts to clean. The IntelliEye sensor has no moving parts to clean, so your mouse stays smooth and precise.



(A8710) **\$55**

Ask
About...



MS Office Keyboard

Discover the Microsoft Office Keyboard, you can scroll, move between programs, cut, copy, paste, go back and forward the things you do all the time at the touch of a button. The unique, left side Single Touch Pad offers you two handed control and flexibility for a more efficient way to work.



(D0986) **\$79**

MS Wireless Intellimouse Explorer

Experience the world's most powerful optical technology and wireless freedom in a stylishly unique and comfortable design. IntelliEye® Technology Power Saving Features, Ergonomic Design, Enhanced Grip, 2 Extra Buttons, 5 Customizable Buttons, Faster Wheel Scrolling, USB Connector.



(D0990) **\$139**

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NEW!!

Lexmark Z65N Color Jetprinter

- Ultimate print quality at up to 4800 dpi resolution
- Up to 21ppm black and 15ppm colour printing
- New ease of use features
- Ethernet network ready

\$565

Rent*\$6.33/wk (E7292)



NEW!!

Lexmark Z55 Color Jetprinter

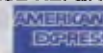
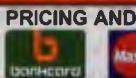
- Incredible print quality at up to 3600 dpi resolution
- Up to 17ppm black and 13ppm colour printing
- New ease of use features
- 12-month LexExpress replacement warranty

\$323

(E7291)

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hp LaserJet & business Inkjet printers

hp LaserJet 3300 & 3330

full-featured multi-function printer

•Up to 14 ppm (A4 size) •compact size to save office space •The HP Ultra Precise print cartridges print more than 2,500 pages each •Optional high-capacity cartridge print up to 3,500 pages •Duty cycle of 10,000 pages-per-month •One-year warranty •Digital copying 14cpm 600 x 600dpi •Flatbed scanner scans up to 216 x 381, 600ppi colour •90MHz mm •3330mfp- 32MB RAM •3300mfp- 32MB RAM.



hp LaserJet 3300mfp

digital printer-copier-scan Rent* \$13.10/wk (E3828) **\$1,169**

hp LaserJet 3330mfp

printer-fax-copier-scan-fax Rent* \$17.37/wk (E3864) **\$1,550**

hp LaserJet 4100mfp Series

intelligent multi-function printer

•Print, copy & colour scan in one machine. The multi-function printer saves costs and office space •Prints at 24ppm (A4) with first page out in less than 12 seconds •The 250MHz processor, 64MB RAM and 5.1GB hard disk enable fast processing of large files and print jobs •Scan resolution up to 600 ppi •Walk-up copying is easy and simple •HP print cartridge and software work hand-in-hand to allow users to monitor and order supplies, hence ensuring uninterrupted printing, consistent output quality and efficient workflow.



hp LaserJet 4100mfp

Rent* \$59.03/wk (E3829) **\$6,397**

hp business Inkjet 2600 Series

wide-format (A3+) colour network printer

•Up to 15ppm (black & white) and 11ppm (colour) in fast 11ppm (colour) A4 •Complex graphic documents easily handled with power of dual processors (167/160MHz) and 48MB of printer memory (upgradable to 176MB) •Wide-format (A3+) high quality printing •Up to 1200 x 600 dpi •HP PhotoRet 3 colour layering technology.



hp business Inkjet 2600

Rent* \$21.83/wk (E3874) **\$1,948**

hp business Inkjet 2600dn

(network duplex) Rent* \$30.67/wk (E3875) **\$3,090**

hp LaserJet 4600 Series

The HP Color LaserJet 4600 series printers and HP smart printing supplies are a simple, reliable, and affordable way to add high-quality, high performance, and high-speed color laser printing to your business. These powerful printers expand along with your business and can be shared over a network. Their ease of use, flexible options, and superior print quality make them the printers of choice for any office looking for an affordable solution to business color printing needs.



hp LaserJet 4600

96MB RAM

Rent* \$45.01/wk (E7298) **\$4,758**

hp LaserJet 4600dn

96MB RAM, auto-duplexing

Rent* \$51.28/wk (E7299) **\$5,557**

hp LaserJet 4600dtn

160MB RAM, auto-duplexing, additional

500 sheet feeder tray Rent* \$64.54/wk (E7300) **\$7,250**

hp LaserJet 8550 Series

Get ahead with professional in-house printing.

With its advanced features and exceptional performance, your productivity will be dramatically increased. The industry standard for departmental network colour printing, this top-of-the-line printer offers a complete network printing solution that grows with your business. •Paper sizes up to A3 •60,000 page duty cycle and 24 ppm •Print on both sides of the page with the optional duplex unit (standard on 8550dn & gn).



hp LaserJet 8550

Rent* \$73.41/wk (98869) **\$8,248**

hp LaserJet 8550n

Rent* \$87.72/wk (98870) **\$10,462**

hp LaserJet 8550dn

Rent* \$98.78/wk (98871) **\$12,186**

hp LaserJet 8550gn

Rent* \$120.56/wk (98872) **\$14,873**

hp Inkjet cp1700 Series

professional wide-format (A3+) colour printers

Designed for small businesses and design professionals.

A powerful communication tool that produces professional colour business documents, collaterals, premium •Up to 16ppm black and 14.5ppm colour (cp1700 printer) •16MB built-in RAM •Up to 5,000 pages per month duty cycle •Supports Windows 95, 98, Me, NT4.0, 2000 •Energy Star compliant •Off mode 6 watts •150-sheet standard input tray •Wide format printer media sizes 4 x 6" (A6) to 13 x 19" (A3+) •Straight paper path.



hp colour Inkjet cp1700

Rent* \$13.17/wk (E0150) **\$1,175**

hp colour Inkjet cp1700d

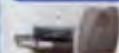
Rent* \$15.45/wk (D6139) **\$1,379**

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hp LaserJet 1000 USB



(C9361) **\$599**

hp LaserJet 1200 Series

1200



(B9799)

\$785

1200

scan/copy

(B9968)

\$925

1200n-16MB

(B9958)

\$1,295

hp LaserJet 2200 Series



hp 2200d

(base unit)

(B9956)

\$1,537

hp 2200dn

(B9957)

\$2,045

hp 2200dtn

(B9958)

\$2,585

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hp deskjet 845c

Step up to HP's photo-quality printer that gives you true-to-original brilliant colours

- crisp black text and photo-quality images
- up to 600 x 1200 dpi
- no swapping ink cartridges to print outstanding photo-quality colour
- ideal for work and other creative projects
- prints up to 8 ppm black and 5ppm colour
- USB connectivity



(D3921)

\$169

hp officejet V40

All In One Scanner/Printer/Fax/Copier

- 8 ppm, 600 dpi black text for professional business documents.
- Up to 7 ppm and 2400 dpi color printing on premium photo papers.
- 36-bit color scanning with 600 x 1200 (1200 x 1200 dpi enhanced) scan resolution.
- Plain paper black and color fax with 14.4k modem, 60-page fax memory, 40 speed dials for fast transmission.
- 20-page automatic document feeder for unattended faxing and copying Colour fax and copy at a touch of the button - without being connected to a PC
- Included OCR software keeps you from having to re-type hardcopy text documents.



(D7688)

\$499

hp deskjet 948c

Explore your creativity and print photos easily with hp's premium photo-quality colour printer

- up to 2400 x 1200 dpi
- optional automatic two-sided printing
- space-saving fold-up paper tray
- best photo-quality with HP PhotoREt 3
- parallel and USB connectivity
- prints up to 12 ppm black and 10 ppm colour
- USB Peripheral Cable



(E6397)

\$275

hp PSC 950

PSC 950 printer, scanner, copier, fax.

- Up to 19ppm black and 16ppm colour printing with 2400 x 1200 dpi resolution for professional looking documents.
- Preview and print photos from a digital camera memory card without PC intervention.
- Creative copying features include instant poster, automatic fit-to-page function.
- Flatbed design allows for easy scanning of books and other 3-D objects, plus scan directly into your e-mail.
- Flatbed fax - great for sending short faxes (1-3 pages) by manually feeding each page, and receiving faxes; 14.4 kbps fax modem with Optical Character Recognition (OCR) software
- Prints and copies on a wide variety of papers. 100-sheet input paper tray, 20-sheet 4 x 6-inch photo paper tray, 50-sheet output tray. Optional networking.



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Best Photo-Quality plus Premier Business Printing

- Infrared printing from PDAs, notebook computers, and other mobile devices.
- Up to 17 ppm in black, 13 ppm in colour
- Optical sensor detects paper type, then selects the ideal print mode
- Automatic Duplex printing capability



Rent* \$6.61/wk (B1967)

\$590

hp officejet D145

print, scan, copy and fax functions

- Fast, High Quality output - fast printing at up to 19 pages per minutes in crisp black and up to 16 in photo-quality colour, copies up to 18 sheets per minute in black, and up to 16 in colour
- Great Productivity fax features - fast colour faxing with a 33.6 Kbps modem, one-touch key pads, speed dials and other fax functions
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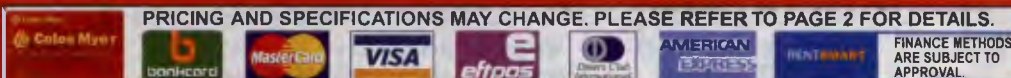
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hp scanjet 5470c

High-performance professional scanner.

Your projects will shine with the 5470c color scanner. Scan 2400 dpi and 48 bit color. Get preview scans in 8 seconds. Eight one-touch buttons let you scan, e-mail, photo reprint, and more.

- MS Windows 95/98/2000/Me/NT4.0
- Includes USB & parallel cable, power cord and active transparency adaptor.
- RES: 2400dpi optical, 2400 x 2400dpi hardware
- 1 year hardware warranty & telephone support

Rent* \$5.92/wk (C7652)

\$529



active
transparency
adaptor.

hp scanjet 7400c

Market-leading image quality!

with
transparency
adapter

Easy to create impressive communications projects and manage business critical documents while saving time and resources.

- up to 2400 dpi
- true 48-bit color
- you'll get professional results in seconds.
- Windows® 98, 2000, Me, NT® 4 and Universal Serial Bus (USB).
- 1yr hardware warranty & telephone support.

Rent* \$10.97/wk (B9949)

\$979



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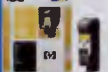
ink cartridges

No 29 Black Inkjet Cartridge



(21919) **\$69**

No 45 Black Inkjet Cartridge



(22643) **\$69**

No 78 Tri Colour Inkjet Cartridge large



(97335) **\$139**

toner



hp c4092a LaserJet print Cartridge for HP LaserJet 1100, 3200; 2500 page toner

(70459) **\$130**



hp 92298a Blue LaserJet Print Cartridge for LJ 4/M,4+/M+,5/N/M 6800 page Toner

(07995) **\$199**



hp 92298x LaserJet Print Cartridge for LJ 4/M+/M+/5/5M/5N 8800 Page Toner

(42504) **\$209**

paper



hp c7014a hp colorfast photo paper t3, a4 20 sheets

(C6528) **\$58**



hp c7006a hp photo quality, semi-gloss, a4 25 sheets

(C6840) **\$15**



hp q1936a hp premium inkjet paper, a4, 200 sheets

(D9329) **\$39**

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MONO LASER PRINTER

EPSON EPL-5900L



NEW

The class leading desktop laser printer. Fast durable and high quality for the value conscious home and small office • Superior print quality • Fast 12ppm • 1200dpi class resolution

Rent* \$6.54/wk (E5318) **\$584**

LASER PRINTER

EPSON STYLUS C60



• 2880 x 720 dpi resolution
• Fast 12ppm* for both Black and Colour Text Memo (*at economy mode)
• Precise Super fine detailed printing with up to 2880dpi, MicroPiezo Print Head and 4pl Variable Sized Droplet Technology
• Four-colour ink system.

(D0042) **\$259**

PRINTER

EPSON STYLUS C70



• A4 printing
• 16ppm black text
• 2880 dpi for best resolution
• USB and Parallel port interface,
• Micro dot output: 3pl in colour and 6pl in black

(D3070) **\$419**

PRINTER

EPSON AL-C1000



High quality, affordable A4 colour laser printer. Ideal for small business or home office environments. Up to 20ppm mono, 5ppm in full colour, EPSON 2400 RIT, 80MB memory, low running costs and easy to maintain. Proprietary EPSON imaging technologies ensure superior output with clear, sharp text and high-contrast, colour-accurate images.

Rent* \$27.48/wk (E3772) **\$2,769**

PRINTER

EPSON STYLUS C41UX



• Up to 12 ppm* black text printing
• Up to 1440 dpi photo quality printing resolution
• USB-enabled and complete with cable
• Intelligent Ink System
• Fast, easy set-up and operation
• Includes USB cable in the box!

(F0853) **\$169**

PRINTER

EPSON STYLUS PHOTO810



• On-demand Inkjet (piezoelectric) • 48 x 6 nozzles • Black text (memo) A4 Approx. 12ppm (Economy) • Full page colour A4 Approx. 1.4ppm (Normal) • USB compatible
• Colour: Cyan, Magenta, Yellow, Light Cyan, Light Magenta • DRIVERS Microsoft Windows 95/98/2000/Me/NT 4.0. (*at economy mode)

(E0536) **\$369**

PRINTER

EPSON STYLUS C80



• Up to 20 ppm* for black text (*at economy mode) • Constant monitoring of ink consumption with the Intellidrive ink system in each of the four ink cartridges
• Pigment inks for prints that are fade, water and smudge-resistant • Super fine printing with up to 2880dpi.

Rent* \$6.15/wk (D1665) **\$549**

PRINTER

EPSON STYLUS COLOR1290



• A3+ • 6 Colour photo printing
• True Border-free Edge to Edge printing
• High Speed 4pl Ultra MicroDot printing at 2880 dpi • Over 20 years lightfast prints
• Features Print Image Matching technology

Rent* \$11.18/wk (C2150) **\$998**

PRINTER

EPSON AL-C2000



Workgroup colour laser printer that delivers professional quality output. Up to 20ppm mono, 5ppm in full colour, EPSON 2400 RIT, dual processors, 32MB memory, integrated network adapter, Proprietary EPSON imaging technologies ensure superior output with clear, sharp text and high-contrast, colour-accurate images.

Rent* \$38.56/wk (A7365) **\$4,076**

SCANNER

EPSON EXPRESSION 1640XL



The Expression 1640XL A3+ scanner features EPSON's most advanced scanning technologies providing high speed, maximum detail and superior sharpness and clarity.

Rent* \$50.74/wk (B1330) **\$5,499**

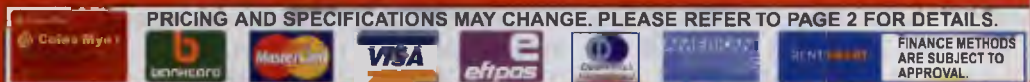
EPSON EPL 5900



• 12ppm
• True 1200dpi Resolution
• 200MHz RISC Processor • USB & IEEE1284 Parallel Interface • 8MB Memory – Expandable up to 136MB • Standard 250 Sheet Multi Purpose Tray & Optional 500-Sheet Lower Paper Cassette Unit

Rent* \$7.49/wk (E5160) **\$669**

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S100SP Bubble Jet Printer



- High speed printing, up to 5 ppm black text and up to 2 ppm colour.
- USB interface for Windows
- Dual ink drop sizes for fine printing
- 720 x 360dpi

(E4209) **\$115**

D200SP Bubble Jet Printer



- Vivid Photo Function
- 2880 x 720 dpi
- Up to 5ppm black & white text
- Separate black and tri-colour ink tanks

(E1132) **\$149**

S300 Bubble Jet Printer



- Up to 11 black and white and 7.5 Colour pages per minute
- Up to 2400 x 1200dpi print resolution
- Separate black and tri-colour ink tanks
- USB Interface for Windows
- Compact footprint - ideal for the home office
- Colour lasts up to 25 years using Canon's Photo Paper Pro

(D4023) **\$218**

S520 Bubble Jet Printer



- Prints up to 14 B/W and 9 colour ppm
- Up to 2400 x 1200 print resolution
- Colour lasts up to 25 years using Canon's Photo Paper Pro
- Connect to USB or Parallel
- Creates prints without borders upto A4 size
- Replace all four ink tanks individually

(E1136) **\$349**

S750 Bubble Jet Printer



- First Bubble Jet With 20ppm
- 2400 x 1200dpi
- Print full bleed A4 photos
- Four Individual Ink Tanks

(E1134) **\$475**

S900 Bubble Jet Printer



Rent* \$8.68/wk
(E1135) **\$775**

- Prints A4 Photo's in approx 1min
- 2400 x 1200 Optical dpi
- Six Individual Photo Ink Tanks
- A3+ Printing on S9000

Rent* \$11.75/wk
(E1248) **\$1,049**



LBP810

(C3917) **\$498**

- High resolution 600 dpi printing for crisp text and graphics
- 8 ppm engine speed
- Wide media compatibility, print transparencies, envelopes, postcards etc
- Outstanding line definition - equivalent to 2400dpi horizontally
- Parallel & USB connections



LBP1000

Rent* \$10.85/wk
(95983) **\$968**

- 10 pages per minute print engine at 1200 dpi resolution
- Energy saving 'On-Demand' toner fusing
- Cost-saving 'economy' printing mode
- Powerful processor to ensure maximum throughput



LBP2000

Rent* \$18.03/wk
(E1235) **\$1,609**

- Affordable A3 Laser Printing
- 1200 x 600 Optical dpi
- Up to 20ppm
- PCL6 With Complete Network Options

SCANNERS...

D646U Flatbed Scanner



- Fabulous Entry Level Scanner
- 600 x 1200 Optical dpi
- Z-Lid For Easy Book Scanning
- Modern Software Suite
- Archsoft Photo Studio 2000 + OCR Software

(E1151) **\$168**

N670U Flatbed Scanner



- One touch scan controls
- USB Interface
- 600 x 1200 dpi
- Scan, click and burn photos onto CD's.
- Advanced Z-Lid cover simplifies scanning of bulky items, books and magazines

(E1155) **\$175**

N1240U Flatbed Scanner



- Amazing 1200 x 2400dpi optical with selectable resolution up to 9600dpi.
- Stylish charcoal and aluminium finish.
- New Z-lid for scanning thick books etc.
- Software included OmniPage and PhotoShop Elements
- 1200 x 2400dpi

(C7589) **\$259**

D1250U2 /D1250U2F Flatbed Scanner



- High Speed At the Right Price
- 1200 x 2400 DPI Optical Resolution
- USB 2.0 For Faster Scanning
- Easy One Touch Control
- Photo Studio 2000 Omnipage Pro 9.5 OCR Software

(E1246) **\$218** (E1230) **\$299**
• 35mm Film Scanning

D2400UF Flatbed Scanner



- Film and Slide Capable Scanner
- 2400 x 4800 dpi resolution
- 48-bit colour
- Built-in film scanner for 35mm, 120 format and 4 X 5" format
- Wide aperture lens
- USB Interface

Rent* \$7.61/wk
(B9840) **\$679**

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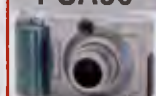
PSA100



(E5357)

\$499RRP

PSA30



1.2 MEGA PIXEL

(E3967)

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PSA40



2.0 MEGA PIXEL

(E3969)

\$845

PowerShot DIGITAL IXUS V2



(E5360)

\$1,039

PowerShot DIGITAL IXUS 330



(E5361)

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3.2 MEGA PIXEL

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KEY FEATURES:

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- Bundled HeadCasting software for 3D communication
- True multi-display support under the Microsoft® Windows® 2000 operating system
- Third-generation DualHead® technology including eDualHead browser enhancements



G55+MDHA32DB	Matrox G550 32Mb Single DVI output, Dual Head display	OEM	(C7873)	\$305
G55+MADDA32DB	Matrox G550 32Mb Dual DVI output, Dual Head display	OEM	(C7874)	\$335
G55+MDHA32DR	Matrox G550 32Mb Single DVI output, Dual Head display	RETAIL	(C7875)	\$345
G45+MVTA32DRI	Matrox G450 32Mb Dual Head display	RETAIL	(C0016)	\$675

Marvel G450e TV (PAL) 32Mb DDR Inc Matrox PC-VCR and Matrox DVD Inc Ulead Videostudio 4.0 and Ulead Photo Explorer 6.0



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(C5312)

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56K V.90 External Voice/Fax/Data Modem

- Fast, stable and reliable
- Intel® Modem chipset
- Crystal clear hands free voice transfer
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56K Fax/Voice/Data 56k Modem

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USB 4-Port Hub

- Easy and convenient access to USB ports
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Easy, fun digital video editing - NOW with ULEAD® 5 DVD Special Edition

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(A1794) **\$179**

SWANN FIREWIRE™ STARTER KIT

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- 1 year "Hassle Free" warranty

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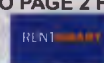
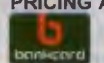
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ADVC-50 DV CONVERTER

Converts analogue video to DV in Realtime. Perfect for EZDV, RaptorRT or any OHCI/DV capture card providing both analogue input and easy cable access. Supports NTSC/PAL and all operating systems.

(F1170)

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High quality DV Editing



(F0859)

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With EZDV, you use your camera's digital dataport to capture and transfer your video to your computer. EZDV can capture short selected clips or full-length tapes in one pass. Now with 16:9 & DVCam support.

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(C9352)

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C6461

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(DV In & DV/Analogue Out)

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(89063)

\$155

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(98455)

\$309

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(E4965)

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MVR1000 is a PCI based encoder that converts analogue video to high quality MPEG-1 & 2 in Real-Time as well as DV to MPEG encoding via any DV solution that uses Adobe Premiere.



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ProCoder - The Ultimate Video Format converter

Allows you to convert from one video format to another using Canopus high quality and high speed codec. Supports MPEG 1 & 2, Canopus DV, Microsoft DV, any Video for Windows codec, Quicktime, NTSC to PAL etc...

Sound Forge 6

EDIT, RECORD, PROCESS & ENCODE AUDIO ON YOUR PC

This industry-standard application is perfect for audio editing, recording, effects processing, and rich media encoding. Version 6 continues to improve by adding features that make it even faster and more powerful than ever!

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(D1776)

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TV TUNER CARD & VIDEO RECORDER

PVR allows you to watch/record live TV onto your hard drive in DVD quality (MPEG2)



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128MB DDR Memory
TV out and DVI support
Twin Turbo Cooling
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Winfast TV2000 XP TV Tuner

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Remote Control
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Geforce 4 A250 Ultra TD NVIDIA Ti 4600 GPU

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TV out and DVI support
Twin Turbo Cooling
(E4902) **\$855**



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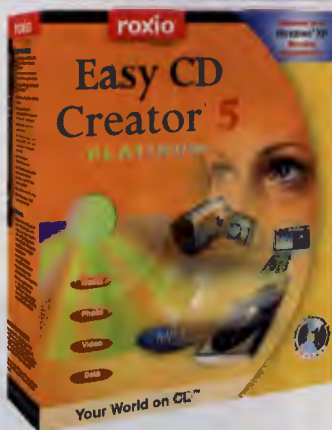
Easy CD Creator⁵ PLATINUM

(C0730)

\$125

Go beyond the software that came with your CD recorder with Easy CD Creator 5 Platinum the most complete and powerful CD burning software! New version allows the user to create data DVD's.

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(D3818)

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(C4282)

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(C7856)

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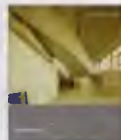
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AutoCAD 2002 (C7859)



Autodesk Architectural Desktop 3.3 (C9723)



Autodesk Viz 4 (E1066)



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Volo™ View 2 software is a cost-effective, easy-to-use digital design viewing solution that lets everyone on your team electronically review, mark up, measure, and plot AutoCAD® and Autodesk Inventor™ based drawings. Upgrades also available.



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AutoSketch 8

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(D9136) **\$229**

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(D5996) **\$98** QuickCAD

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Symbols 2000 Engineering

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(C0676)
\$209

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An essential set of tools for creating video for the web, DVD, CD-ROM and video tape. Built-in cross platform DV support. Work more productively with new storyboarding capabilities, enhanced monitor and timeline windows, sophisticated new audio mixer. Helps you streamline your most demanding video editing and production tasks.

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Adobe
Design Collection

Contains the following leading edge design and publishing applications in one fully integrated suite

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Adobe Publishing Collection 12

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(E7784) **\$2,435**

Adobe
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Powerful applications for business, education, and small office/ home office professionals

- PageMaker 7.0
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Adobe GoLive/LiveMotion Bundle

Adobe

(E0669) **\$1,023**

Adobe
GoLive / LiveMotion

Rapidly animate, develop, manage and deploy dynamic interactive sites for the web and wireless devices with these two programs. This

bundle includes • GoLive version 6.0 and • LiveMotion version 2.0.

Adobe Open Options Transactional Licence Program

Adobe

The Adobe Open Options Transactional Licence Program (TLP) makes it easy for organisations with as few as ten workstations to participate in volume purchasing. It offers ease of entry, covers most Adobe products, and is available worldwide. The TLP is open to corporate, government, education, and small business customers.

Harris Technology is an Adobe Authorised Reseller who can help you take advantage of the Adobe Open Options Transactional Licence Program. For more information, please refer to Web Direct Link www.ht.com.au/cat/adobe.

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procreate™

 (C9237) **\$825**

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\$455

Painter 7

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procreate™ KnockOut 2.0

 Full (D3901) **\$658**

 UPGRADE (D3905) **\$319**

Part of the **procreate™** line of software, KnockOut 2 lets you preserve fine image details that were once impossible to mask precisely. It's an ideal plug-in for Adobe® Photoshop®.

COREL Bryce 5

 (C5869) **\$635**

 UPGRADE (C9209) **\$335**

Create breathtakingly realistic 3D landscapes and animations with Bryce 5. Smooth network rendering saves valuable time by letting you render images on multiple computers. A new Light Lab gives you robust control over lighting direction, and the new Tree Lab ensures a more accurate depiction of real-world environments. Bryce 5 - opening new worlds of creativity.

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KPT Vector Effects 1.5

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Word Perfect Office 2002 Standard

 (C3601) **\$823**

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COREL CorelDRAW 10

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Includes CorelDRAW® 10, Corel PHOTO-PAINT® 10 and the all new Corel R.A.V.E™. Add a new dimension to your creativity with CorelDRAW® 10 Graphics Suite — a comprehensive graphics solution that delivers vector illustration, layout, bitmap creation, image-editing, painting and animation software all in one package!

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KPT 6

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Platforms supported:

Server:	Client:
Windows NT and above	DOS Windows ME Windows NT
Windows 2000	Windows 2000 Windows 9.x
Netware 3.12	Windows 3.x Windows XP

5 Users (E0704) **\$635**

10 Users (E0705) **\$1,099**

25 Users (E0707) **\$2,379**

Norton AntiVirus Corporate Edition 7.6 for Small Business Desktop & Server & Microsoft® Exchange Ideal for Microsoft Small Business Server

Platforms supported:

Server:	Client:
Windows NT and above	DOS Windows ME Windows NT
Windows 2000	Windows 2000 Windows 9.x
Netware 3.12	Windows 3.x Windows XP

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25 Users (E8221) **\$3,019**

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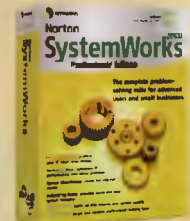
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(D0680) **\$159***

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5 User

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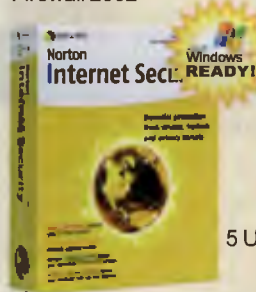
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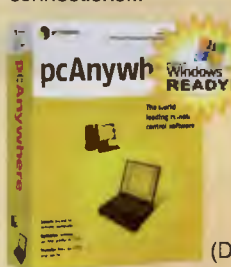


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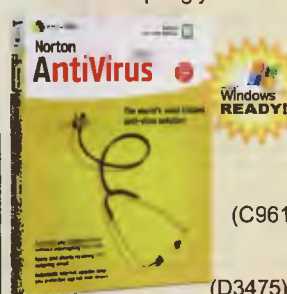
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Norton pcAnywhere V10.5 / 5 User

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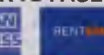
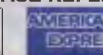
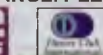
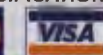
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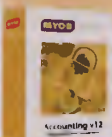
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(D1365) **\$979**



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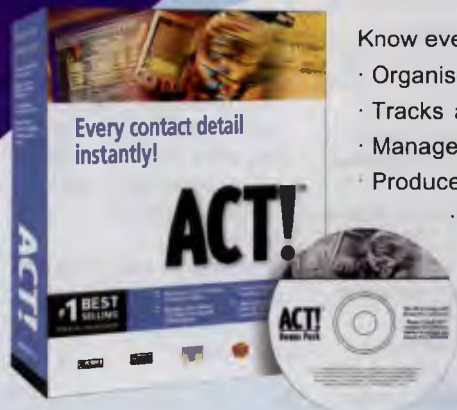
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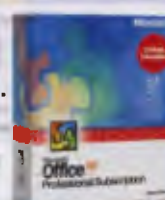
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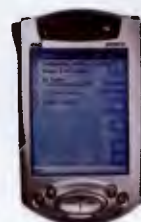
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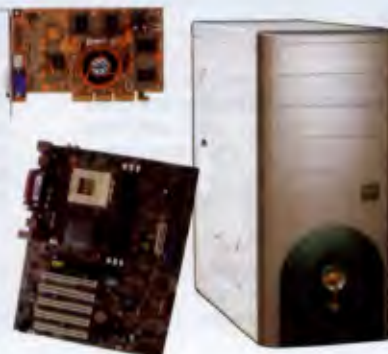
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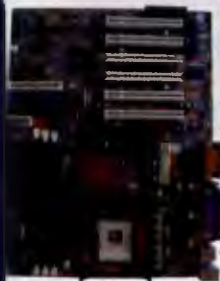
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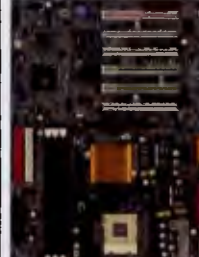


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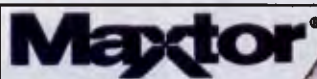
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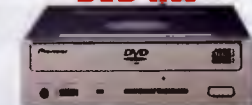
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- Includes Nero Burning Rom

16 x DVD-Rom



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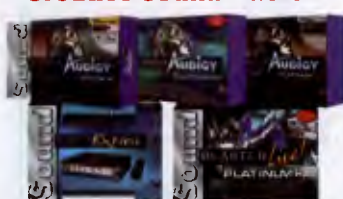
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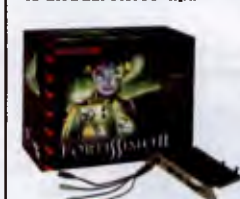


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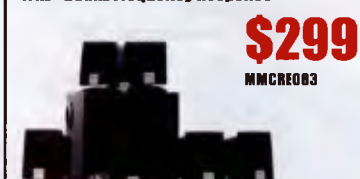


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- 469(H) x 456(W) x 438(D)mm
- 15-pin Mini D-Sub Connector
- Weighs 23.5Kg



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- 15" Colour LCD
- 15" Viewable (Diagonal)
- 0.297mm Pixel Pitch
- Up To 1024 x 768
- 16.8 Million Colours
- 386(H) x 406(W) x 175(D)mm
- 15-pin Mini D-Sub Connector
- S-Video Input
- Weighs 6.9Kg



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- 17.4" Colour LCD
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- 15-pin Mini D-Sub Connector
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- 21" Colour CRT
- 16 x 12" Viewable
- 0.24mm Grille Pitch
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- 800 x 600 @ 100Hz
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- 128MB DDR RAM
- DVI & TV Out
- 6.4GB/Sec Memory Bandwidth
- 700 Billion Operations per Second
- Vertex Shaders



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nVIDIA GeForce 4 MX 440

- nVIDIA GeForce 4 MX 440 Processor
- 64MB DDR RAM
- TV Out
- 6.4GB/Sec Memory Bandwidth
- 34 Million Triangles per Second
- 1.1 Billion Texels per Second



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DCGE028

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- 32/64MB RAM
- 2.7GB/Sec Memory Bandwidth
- 800 Million Texels per Second



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- TV-Tuner & RF Remote Control
- 6.1GB/Sec Memory Bandwidth
- 2.760 Million Texels per Second



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DCGHI006

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- 1.3GB/Sec Memory Bandwidth
- 700 Million Texels per Second



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64MB PCI

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H: 500mm
Power Supply:
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Front Midi/Game Port
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D: 500mm
H: 500mm
Power Supply:
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CAAD088

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D: 491mm
H: 422mm
Power Supply:
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Black also available

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CAAD084

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D: 440mm
H: 430mm
Power Supply:
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CAAD084

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2 x External 2.5" Bays
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D: 475mm
H: 430mm
Power Supply:
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CAAD085

ADELONG M71 ATX CASE

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1 x External 2.5" Bays
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D: 491mm
H: 422mm
Power Supply:
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CAAD092

DELUXE AT/ATX 250 WATT DESKTOP CASE

2 x External 5.25" Bays
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W: 442mm
D: 473mm
H: 155mm
Power Supply: 300W ATX

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CAAD012

ADELONG 3004 ATX CASE

3 x External 5.25" Bays
2 x External 2.5" Bays
W: 195mm
D: 445mm
H: 430mm
Power Supply:
250W ATX

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CAAD090

Adelong Full Tower Case

W: 190mm
H: 622mm
D: 430mm
Drive Bays: 5 x 5.25"
5 x 3.5" (3 Internal)
Power Supply: 300W ATX

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CAAD040

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W: 224mm
H: 436mm
D: 500mm
Drive Bays:
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Power Supply: 400 Watt ATX
2 Additional cooling fans
Also available in charcoal

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19" Rackmount Cabinet

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Chassis:

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Power Supply:

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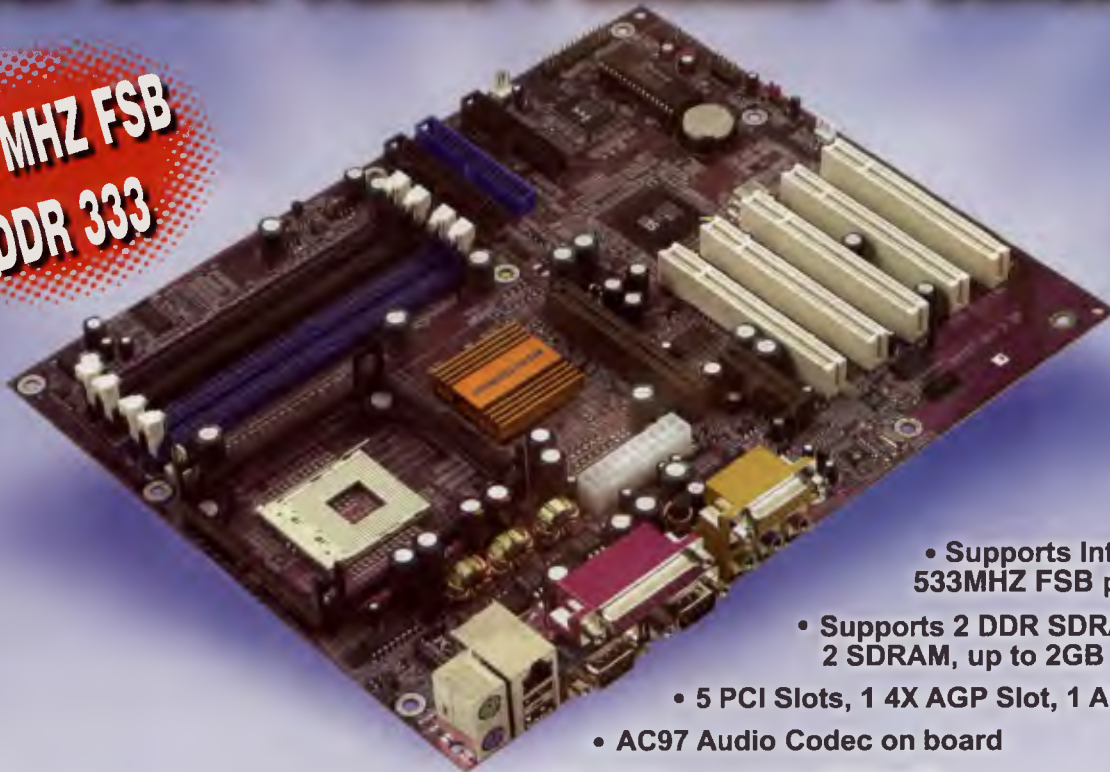
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LG 24x10x40 w/Exact Link	\$140
LG 32x10x40 w/Exact Link	\$155
80 Min Kingworld Box of 25 (16x)	\$ 15
80 Min Laser 32x Speed Single	\$ 1

<u>Video Cards</u>	
8 MB AGP or PCI	\$ 40 / \$ 55
32 MB TNT2 M64 AGP	\$ 66
32 MB TNT2 M64 PCI	\$ 98
32 MB Kryo 2 AGP	\$138
32 MB Geforce2 MX200 AGP	\$ 80
64 MB Geforce2 MX200 AGP w/tvout	\$ 120
64 MB Geforce2 MX400 AGP w/tvout	\$ 145
64 MB Geforce4 MX440 AGP w/tvout	\$ 203
64 MB Radeon 7000 Dual Head	\$ 119
64 MB DDR (ATI) Radeon 8500	\$ 465

<u>Monitors</u>	
15" LG	\$ 240
17" Digital Monitor	\$ 275
17" Preview w/Multimedia Speakers	\$ 295
17" Digital Flat Monitor	\$ 298
19" MAG	\$ 488
15" LCD Omni w/speakers	\$ 785
15" LG LCD	\$ 880
17" LCD Omni w/speakers	\$1455

<u>Case & Power Supplies</u>	
ATX MIDI (Small) 300 Watt	\$ 42
ATX MIDI (BIG) 400 Watt	\$ 50
Full Aluminum ATX Case (No PSU)	\$165
Aopen 250 Watt Case	\$ 80
300 Watt Power Supply ATX	\$ 35
350 Watt Power Supply ATX12V P4	\$ 45
400 Watt Power Supply ATX12V P4	\$ 55

<u>Sound Card</u>	
Creative SB PCI Live Value OEM	\$ 68
Creative SB Live Platinum	\$285
Creative SB Audigy PCI	\$209
Creative SB Audigy Platinum	\$419
Creative SB PCI Live 5.1	\$ 75

<u>Speakers</u>	
Altec Lansing AVS300	\$ 83
Altec Lansing AVS500	\$130
Creative Inspire 2.1 2200 Black	\$ 85
Creative Inspire 4.1 4400 Black	\$119
Creative Inspire 5300 5.1	\$252
Creative PC Works 2.1 SW320	\$ 83

<u>Software</u>	
Windows 98SE or ME or XP Home OEM	\$218
Windows 2000 Pro / XP Pro OEM	\$320 / \$335
OEM Software is with a New PC Only	

<u>Printers</u>	
Lexmark Z22 Colour Printer	\$ 83
EPSON C20UX Colour Printer	\$114
CANON BJC2100	\$117

P4 DDR System

Pentium 4 CPU

ECS P4VMM2 AIO DDR M/B
128MB DDR SDRAM
32MB S3 Savag4 3D Shared
20 GB HDD 5400rpm ATA100
15" Preview Monitor
ATX Midi Case Big 400W
1.44MB FDD
CD ROM 52X
AC 97 3D Sound
Speakers w/Monitor
PS2 Internet Keyboard
PS2 Web Wheel Mouse
Int 56k Modem
Onboard Lan 10/100
Win XP Home or ME

Pentium 4 1.6 GHz \$1,385
Pentium 4 1.7 GHz \$1,445

AMD DDR System

AMD Athlon CPU

ECS K7S5A SiS 735 DDR M/B
256 MB DDR SDRAM PC2100
32 MB GeForce2 MX200
40 GB HDD 7200rpm ATA100
17" LG Monitor
ATX Midi Case Big 400W
1.44 MB FDD
16x DVD Drive
AC 97 3D Sound
800 Watt Sub & Spkr
PS2 Internet Keyboard
PS2 Web Wheel Mouse
Int 56k Modem PCI
Win XP Home or ME

Duron 1 GHz \$1,469
Duron 1.3 GHz \$1,549

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Celeron 1.1 GHz \$1,919
Celeron 1.2 GHz \$1,939
Celeron 1.3 GHz \$1,955
Pentium 3 1.1 GHz \$2,069

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Code	OEM Equivalent	Compatible With:	Price
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CC-2BK	BJI-201BK	BJC-600/610/620 Black	\$6.00
CC-3BK	BJI-643BK	BJC-800/820 Black	\$12.00
CC-4BK	BCI-21	BJC-2000/4000/5000 Series Black	\$7.00
CC-5CL	BCI-21C	BJC-2000/4000/5000 Series 3-Colour	\$12.00
CC-6BKHC	BJI-201BK HC	BJC-600/610/620 Hi-Cap Black (14ML)	\$9.00
CC-7BK	BCI-10	BJ-30 Black	\$9.00
CC-8BK	BCI-11	BJC-70 Black	\$9.00
CC-9CL	BCI-11C	BJC-70 3-Colour	\$17.00
CC-11CL	BCI-61	BJC-7000 Series 3-Colour	\$32.00
CC-12PCL	BCI-62 PHOTO	BJC-7000 Series Photo 6-Colour	\$38.00
CC-13B	BCI-3	BJC-6000 Black	\$25.00
CC-14C	BCI-3C	BJC-6000 Cyan	\$16.00
CC-15M	BCI-3M	BJC-6000 Magenta	\$16.00
CC-16Y	BCI-3Y	BJC-6000 Yellow	\$16.00
CC-17PBK	BCI-3PBK	BJC-6000 Photo Black	\$18.00
CC-18PC	BCI-3PC	BJC-6000 Photo Cyan	\$18.00
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CE-52BK	SO20034	STYLUS Colour/Colour Pro Black	\$20.00
CE-53CL	SO20028	STYLUS Colour/Colour Pro 3-Colour	\$30.00
CE-54BK	SO20047	STYLUS 200/820/Colour II /IIs Black	\$13.00
CE-55CL	SO20049	STYLUS 200/820/Colour II /IIs 3-Colour	\$21.00
CE-56PBK	SO20093	STYLUS Colour 400/500/600/Photo Black	\$17.00
CE-57CL	SO20097	STYLUS Colour 200/500 3-Colour	\$23.00
CE-58BK	SO20108	STYLUS Colour 800/850/1520 Black	\$17.00
CE-59CL	SO20089	STYLUS Colour 400/600/800/1520 3-Colour	\$23.00
CE-60PCL	SO20110	STYLUS Colour 700/Photo/Photo 700 5-Colour	\$26.00
CE-61BKCL	SO20138	STYLUS Colour 300 4-Colour	\$31.00
CE-65BK	SO20187	STYLUS Colour 440/640/660 Black	\$16.00
CE-66BK	SO20189	STYLUS Colour 740/760 Black	\$16.00
CE-67CL	SO20191	STYLUS Colour 440/640/660/740/760 3-Colour	\$26.00
CE-68PCL	SO20193	STYLUS Photo 750 5-Colour	\$33.00
CE-69CL	T003011	STYLUS Colour 900 Black	\$19.00
CE-70CL	T005011	STYLUS Colour 900 Colour	\$24.00
CE-71PCL	T001011	STYLUS Photo 1200 5-Colour	\$29.00
CE-27BK	T007	STYLUS Colour 870/1270 Black	\$24.00
CE-73CL	T008	STYLUS Colour 870 Colour	\$29.00
CE-74CL	T009	STYLUS Colour 1270 Colour	\$34.00

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A3HRP	A3 90gsm Hi-Res Paper	100	\$ 30.00	0.30
A4WF	A4 White Film 100mu	50	\$ 47.00	0.94
A3WF	A3 White Film 100mu	50	\$ 90.00	1.80
A4CF	A4 Clear Film 100mu	50	\$ 39.00	0.78
A3CF	A3 Clear Film 100mu	50	\$ 71.00	1.42
A4FGP	A4 Full Gloss Photo Paper	50	\$ 44.00	0.88
A3FGP	A3 Full Gloss Photo Paper	50	\$ 79.00	1.58
A4PH	A4 Economy Photo Paper	50	\$ 23.00	0.46
AC2	Artists Canvas	25	\$ 60.00	2.40
GC4F	Greeting Card (4 Fold)	100	\$ 28.00	0.28
GCBF	Greeting Card (Bi-Fold)	100	\$ 48.00	0.48
DCCS	Double Coated Card Stock	50	\$ 24.00	0.48
GCS	Glossy Card Stock	50	\$ 24.00	0.48
TTP	T-Shirt Transfer Paper	15	\$ 15.00	1.00
MP	Magnetic Paper	25	\$ 58.00	2.32
BC1	Business Cards (10 per A4)	20	\$ 19.00	0.95



INCLUDES:
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DESCRIPTION (Kits Compatible with Printers listed below)	No. of Refills	Product Code
CANON BJ-30	60	20-BKL
CANON BJC-70/BJC 80	60	21-BKL
CANON BC-01/02 BJ-10E/20 BJ-200 Series & BJC-1000 Series	9	3-BKL
CANON BJ-300/ 330	7	4-BKL
CANON BJC-600/610/620	16	5-BKL
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21	45	19-BKL
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BC-20	9	18-BKL
CANON BJC-3000/6000/8000 Series	12	46-BKL
HP Desk Jet 400/500 Series	6	8A-BKL
HP Desk Jet 600/660/690 Series	6	8B-BKL
HP Desk Jet 700/800/900/1000 Series	8	29-BKL
HP Desk Jet 300 Series & Olivetti JP's!	8	7-BKL
EPSON Stylus 400/800/800+/1000	8	1-BKL
EPSON Stylus Colour /PRO/XL	12	2-BKL
EPSON Stylus 820/colour II/III	12	23-BKL
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	12	33A-BKL
EPSON Stylus Colour 440/460/480/640/660/700/740/760/900	12	33B-BKL
IBM/LEXMARK 4076/1000/1020/2000/2030/2050 Series	12	35A-BKL
IBM/LEXMARK 5000/5700/7000 & Z Series	12	35B-BKL
CANON, EPSON, HP Fluorescent & Photo Realistic Kits!		Please Call!

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DESCRIPTION (Kits Compatible with Printers listed below)	No. of Refills	Product Code
CANON BJC-70/80	3x30	22-CLR
CANON BJC-210/210SP/240/255/265/1000 Series	3x12	25-CLR
CANON BJC-600/610/620	3x8	10-CLR
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21	3x30	17-CLR
CANON BJC-3000/6000/8000 Series	3x8	47-CLR
HP Colour Desk Jet 300/400/500 Series & Olivetti!	3x12	14A-CLR
HP Colour Desk Jet 600C/660C/690C Series	3x12	14B-CLR
HP Desk Jet 850C/855C/870C/1000C Series	3x3	30A-CLR
HP Desk Jet 710/720/890/900 Series	3x3	30B-CLR
EPSON Stylus Colour /PRO/XL	3x4	16-CLR
EPSON Stylus 820/colour II/III	3x12	24-CLR
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	3x12	34A-CLR
EPSON Stylus Colour 440/460/480/640/660/700/740/760/900	3x12	34B-CLR
IBM/LEXMARK 4076/1000/1020/2000/2030/2050 Series	3x6	36A-CLR
IBM/LEXMARK 5000/5700/7000 & Z Series	3x6	36B-CLR
CANON, EPSON, HP Fluorescent & Photo Realistic Kits!		Please Call!

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GRAPHICS

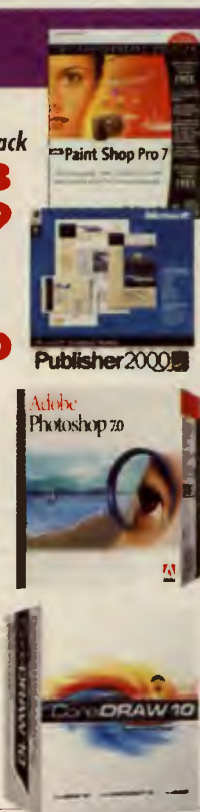
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apc Australian Personal Computer

"Lian Li cases are legendary among PC enthusiasts and case-modders, and are generally considered to be the Rolls Royce of aftermarket PC cases. Not only because they are comparatively expensive, but because their features and attention to detail warrant the price."

PC PowerPlay

"A stunner. All aluminium and built to withstand a direct nuclear strike in the megaton range. As we have mentioned more than once, we even dropped this case down a flight of concrete steps and it barely flinched. Ten bays keep everything snug, three extra fans keep it cool, and slide-off covers and a motherboard tray mean it's ready for upgrade action any time."

atomic

"Undoubtedly the parent of the Aluminium case craze, Lian Li has been incredibly successful in changing the case buying mindset."

See detailed reviews (search "Lian Li") at www.dansdata.com www.overclockers.com.au www.gamingin3d.com

All cases come without power supplies

Aluminium Tower Cases



PC-60USB
Silver full aluminium anodised
\$390 RRP



PC-65USB
With transparent side panel
\$475 RRP



PC-12B
Powder coated external with full aluminium inside
\$320 RRP

Common features

- ◆ Sliding tray for motherboard
- ◆ 2 front ball bearing fans with filter
- ◆ 1 rear ball bearing fan
- ◆ Selectable fan speed control
- ◆ Thumbscrews
- ◆ 490x210x450mm
- ◆ 12 total bay 4x 5.25", 3x3.5", 5x3.5 Hidden

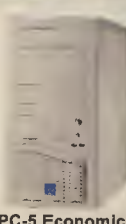


PC-70
Silver full aluminium anodised
\$539 RRP



PC-71
Black full aluminium anodised
\$559 RRP

- ◆ 2 front ball bearing fans with filter
- ◆ 2 rear ball bearing fans
- ◆ Selectable fan speed control
- ◆ Thumbscrews
- ◆ 210X595X588mm. Suitable for dual CPU M/B.
- ◆ 15 total bay



PC-5 Economic
Beige Colour powder coated
\$199 RRP



PC-6 Economic
Silver colour powder coated
\$199 RRP

- ◆ 2 front fans with filter
- ◆ 1 rear fan
- ◆ Selectable fan speed control
- ◆ Thumbscrews
- ◆ 490x210x450mm
- ◆ 12 total bay 4x 5.25", 3x3.5", 5x3.5 Hidden

Aluminium Server Cases



PC-72SCA
Silver full aluminium anodised
◆ SCA-2 hot swap bays supports SCSI Ultra160
◆ SCA-2 backplane module
◆ 2x16cm ball bearing fans
◆ Selectable fan speed control
◆ Thumbscrews
◆ 589x209x574mm
◆ 13 total bays
\$790 RRP



PC-626
Silver full aluminium anodised
270x665x498mm
◆ 14 total device bays
4x5.25, 3x3.5, 8x3.5 hidden for HDD
◆ 4 x 12cm two ball-bearing Suitable for dual CPU M/B
◆ On SCA version: SCA-2 Hot Swap bays, Support Ultra 160, SCA-2 backplane module
\$1190 RRP, SCA \$1390 RRP



PC-76
Silver full aluminium anodised
◆ 20 total bays 6x5.25, 2x3.5, 12x3.5 hidden
◆ 6 ball-bearing cooling fans
◆ 265x559x630mm
◆ Suitable for dual CPU M/B
\$990 RRP



PC-78
Silver full aluminium anodised
◆ 20 total device bays
6x5.25, 2x3.5, 12x3.5 hidden for HDD
◆ 4 x 8cm two ball-bearing fans
2 x 12cm two ball-bearing fans
◆ Suitable for dual CPU M/B (Max size: 12 x13)
\$1650 RRP

Case Accessories

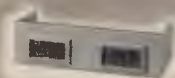


PANEL-65
Silver colour aluminium transparent side panel to suit PC-60USB \$85 RRP

PANEL-75
Silver colour aluminium transparent side panel to suit PC-70USB \$115 RRP



FE-525
Silver Aluminium Front Easy Access all PC ports at the front of the PC \$90 RRP



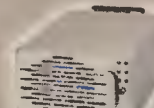
T-4 T-4B
Dual thermometer Silver/Black Monitor CPU/MB/HDD temp
\$59 RRP



MF-30HDD
Expansion mounting kit Add 3 more HDD space to PC cases \$19 RRP



F-7 IC-2 IC-4/IC-6
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EX-12S
SCA-2 Module Ultra-160 Hot swap module. Takes 2x 5.25" bay space \$270 RRP

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Karana Computers	Chuwat 07-3812 5211
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TNQ	Mossman 07-4098 3888

ACT

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Technology Warehouse	Mitchell 02-6242 3966

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PLE Computers	Wangara 08-9309-4771
Nevada Computers	Osborne Park 08 9446 4099
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SA

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Cherry Computers	Adelaide 08-8232 5700
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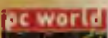
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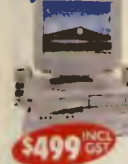


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Integrate ANY Fax (or Modem) into ANY telephone line for fully automatic fax reception. Operates with or without an answering machine. Just plug it into any telephone socket. Two models available.



AUTO MODEM RECEPTION

Choose FMX-PRO when you wish to fit a Modem to your Fax line and the Modem also needs to receive data calls. Directs Fax calls to your Fax and Data Calls to Modem. Barge-in protection is provided to prevent one device interrupting the other while it is in use.



OUTGOING MODEM or EFT-POS

Choose AUTO-CONNECT when you wish to fit a Modem or EFT-POS unit to your Fax line, to make OUTGOING calls. Provides automatic connection on dialing. Other device is then locked out. Ideal for connection of Payphones. Modems and EFT-POS to any Fax, Commander, PABX or any type of Telephone line.



TELEPHONE CALL RECORDING AND OTHER APPLICATIONS

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Record your telephone calls to PC, or other recorder, from an ordinary single line or any multi-line phone system. Automatic operation with start/stop capability from any handset. PC software & cables supplied.



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Operate Two numbers on one line. Auto-Connect will connect your Multiple number calls to one set of phones or answering machine and your Normal number calls to another set of phones or answering machine.



TWO LINE SELECTOR

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NETWORK ISOLATION UNIT

100% Network Firewall Protection! This unit automatically disconnects your Modem Server from your network whenever the modem makes or receives calls and reconnects the modem when it is finished.



MUSIC OR MESSAGE ON HOLD FOR ANY LINE

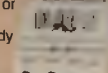
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CONTROL YOUR EQUIPMENT BY TELEPHONE LINE

REMOTE TELEPHONE ACTIVATOR

Call in to Switch ON, Switch OFF or RESET your PC, SERVER or any electrical equipment by telephone line using touch tone commands. RTA connects to any telephone line. Requires PCU or PCR accessory.



RTA-PRO VERSION

PRO version provides independent control of 2 separate outputs, with PIN number security. Status tones for each output are provided on answer. Shares an existing line when used with the Multiple Number service.



POWER CONTROL UNIT

PCU connects direct to the RTA and also to your power socket to allow telephone line dial in switching of the 240V supply connected to your equipment. Easy Plug In User Installation. Controls up to 10 Amps.



PC RESET UNIT

PCR connects to any PC to allow remote telephone PC RESET, or can also be used to turn ON or OFF PC's with ATX style motherboards. Easy User Installation.



TELEPHONE LINE DOOR STATION AND EXTENSION TRANSFER

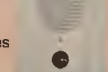
DOOR STATION UNIT

Will RING all of your telephones when a visitor arrives at your front door or gate. Answer to communicate. Open the door or gate with touch tones. Operates on any ordinary single line or multi-line phone system. Requires surface mount or flush mount door phone.



SURFACE MOUNT DOOR PHONE

This unit provides for quick and easy mounting direct onto any wall surface. Your visitor just presses the integral call button to ring your telephones. Provides clear 2 way communication as soon as you answer.



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TELEPHONE CALL TRANSFER

Easy-Transfer allows you to answer a call on one telephone and then TRANSFER the call to another telephone fitted to the same line. Also provides INTERCOM facility. Uses your existing telephones.



ARE YOUR PRODUCTS OR SERVICES WORTH TALKING ABOUT ?

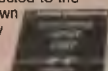
TALKING DISPLAY UNIT

TDU will play 1 or more pre-recorded messages as soon it is triggered by a movement sensor, a switch, or at a preset time interval. Ideal for Product Promotions, Product Information, Message Warnings etc.



MULTIPLE INPUT UNIT

MIU allows for up to 12 separate movement sensors or switches to be connected to the TDU. Each sensor triggers its own unique message, output via any 8 ohm unpowered, powered or amplified speaker.



SPEAKER SWITCHING UNIT

SSU allows for up to 12 separate speakers to be connected to the TDU so that each sensor triggers its own separate message, output on its own separate speaker. Background music can be played at all other times.



AUDIO SWITCHING UNIT

ASU allows the TDU to be connected to any existing PA or Background Music system. The existing PA or Background Music system is then muted or faded whenever a TDU message is broadcast and then reconnected when finished.



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RINGMASTER CLI

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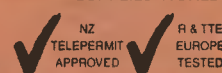


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CANON BJC-50/55/70/80/85/85W
CANON BJC-6102/BJ-10E/20/200/BJC-210/240/255/265/1000
CANON BJC-600/610/620
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-20
CANON BJC-3000/6000/6200/6500/8000 & S400/S500 Series
CANON BJC-7000/7100 Series - Including Optimiser
CANON BJC-8200 & S800 Series
HP Desk Jet 400/500 Series
HP Desk Jet 600/660/690 Series
HP Desk Jet 700/800/900/1000/1100/1200 Series
HP Desk Jet 300 Series & Olivetti JP's!
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EPSON Stylus Colour /PRO/XL
EPSON Stylus 820/colour II/its
EPSON Stylus Colour 200/300/400/500/600/800/850/1520
EPSON Stylus Colour 440/460/480/640/660/670/700/720/740/760/900/1160
EPSON Stylus Colour 680/777/780/785/870/880/875/890/1270/1280
LEXMARK 4076/1000/1020/2000/2030/2050 Series
LEXMARK 3000/5000/5700/7000 Series
LEXMARK Z11/Z12/Z22/Z31/Z32/Z42/Z51/Z52 & Other Z Series

60
60
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16
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20-BKL
21-BKL
3-BKL
5-BKL
19-BKL
18-BKL
46-BKL
43-BKL
52-BKL
8A-BKL
8B BKL
29 BKL
7 BKL
1 BKL
12 BKL
23-BKL
33A-BKL
33B-BKL
Please Call!
35A-BKL
35B BKL
35C-BKL



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CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-20
CANON BJC-3000/6000/6200/6500/8000 & S400/S500 Series
CANON BJC-8200 & S800 Series
HP Desk Jet 300/400/500 Series & Olivetti!
HP Desk Jet 600C/660C/690C Series
HP Desk Jet 850C/855C/870C/1000C Series
HP Desk Jet 710/720/800/900 Series
EPSON Stylus Colour /PRO/XL
EPSON Stylus 820/colour II/its
EPSON Stylus Colour 200/300/400/500/600/800/850/1520
EPSON Stylus Colour 440/460/480/640/660/670/700/720/740/760/900/1160
EPSON Stylus Colour 680/777/780/785/870/880/875/890/1270/1280
LEXMARK 4076/1000/1020/2000/2030/2050 Series
LEXMARK 3000/5000/5700/7000 Series
LEXMARK Z11/Z12/Z22/Z31/Z32/Z42/Z51/Z52 & Other Z Series

3x30
3x8
3x8
3x30
3x6
3x6
3x12
3x12
3x3
3x3
3x3
3x4
3x12
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3x12
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3x6
3x6
3x6

22-CLR
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17-CLR
47-CLR
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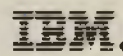
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Picture shown is a Mini Tower with 15" flat LCD monitor.

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